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Central Hillsborough County-Tampa, Florida Wastewater Facilities

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Region 4
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EPA 904/9-81-078
September 1981

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Environmental Impact Statement

Draft

Central Hillsborough County - Tampa Area, Florida

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Draft
Environmental Impact Statement

for
Central Hillsborough County-Tampa, Florida
Wastewater Facilities

Prepared by
U.S. Environmental Protection Agency
Region IV, Atlanta, Georgia 30365

This Draft EIS addresses proposed wastewater facilities for the City of Tampa, the City of Temple Terrace and portions of adjacent unincorporated Hillsborough County. Wastewater management alternatives have been evaluated with particular attention to the impacts of alternative management systems on growth patterns and primary and secondary impacts on wetlands and other area water resources.

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8/13/81
Date

EXECUTIVE SUMMARY

PART A: EXISTING PROBLEM

The Central Hillsborough County-Tampa 201 Facility Planning Area includes the Cities of Tampa and Temple Terrace and a large portion of the unincorporated area of Hillsborough County to the east. This area is a rapidly developing portion of Florida's Gulf Coast. The 1980 population of the study area is estimated to be 519,939. The approved 208 population projections show an increase to 736,500 in the year 2000 and to 956,069 in the year 2020. Most of this growth is presently projected to occur outside the existing developed areas within the City of Tampa. The undeveloped portions of Hillsborough County to the east will also be subject to substantial growth pressure.

The Planning Area is divided into two major subdivisions: the Tampa Service Area (TSA) and the Hillsborough County Service Area (CSA). In turn, the CSA is divided into four subareas: Deltona, Thonotosassa, Brandon, and Riverview-Gibsonton. These areas are shown in Figure 1. Wastewater problems vary widely among the subareas. For this reason, a brief discussion is given of wastewater problems by subarea.

Tampa Service Area

Approximately 60 percent of the Tampa Service Area (TSA) is presently served by sanitary sewers. The existing intercepting and secondary intercepting systems are not adequate to meet future wastewater collection and transmission needs. Portions of this system are undersized for current wastewater flows and others are no longer serviceable due to structural deterioration. These deficiencies have resulted in the overflow of untreated wastewater into the Hillsborough River, streets, drainage canals and some bay waters.

Wastewater is treated at the City of Tampa's Hookers Point Advanced Wastewater Treatment Facility. This facility has a capacity of 60 million gallons per day (mgd). This capacity is projected to be exceeded by the late 1980's. Treated effluent is discharged to Hillsborough Bay.

The unsewered portions of the TSA rely on individual disposal systems. Remaining areas for development within the TSA are unsuited for further use of individual systems, such as septic tanks, for the expected population densities, due to soil limitations, shallow depths to the water table or location with respect to floodplains. Further development of individual disposal systems could threaten water quality in Hillsborough River which is used as a source of drinking water supplies for the City of Tampa.

Hillsborough County Service Area

The Deltona subarea is currently sparsely developed and rural in character. Any extensive urban development in the area would probably require centralized sewer service due to high water table conditions.

The Thonotosassa subarea is also currently sparsely developed. Soil conditions here are typically satisfactory for on-lot systems. No signficant wastewater problems have been identified or are expected in the area.

Brandon is served by its own sewer system owned by Hillsborough County. The system originated in 1972 when the County purchased the sewerage system serving the Brandon Shopping Center. The rapid extension of this system due to population growth has resulted in an extensive system of manifolded force mains and numerous pumping stations. This system is approaching its design capacity and further expansion could result in major operational problems. Current wastewater flows are pumped to Tampa's Hookers Point plant for treatment.

More than 40 package treatment plants are also present in the Brandon subarea. The majority of these facilities consist of extended aeration treatment plants and percolation ponds for effluent disposal. The percolation ponds are thought to be causing some build-up of nitrate levels in the Floridan aquifer. Septic tank systems are used extensively in rural areas and subdivisions. No significant problems have developed as a result of their use in this subarea. Soil conditions in Brandon are similar to those in Thonotosassa.

In the Riverview-Gibsonton subarea, wastewater service is currently provided by septic systems and package plants. Soil conditions in this area are not suitable for continued operation of on-lot systems. Some problems have also been experienced with the percolation ponds related to operational deficiencies and nitrate buildup.

PART B: DESCRIPTION OF ALTERNATIVES

The purpose of the EIS is to select the wastewater treatment and disposal system which is the most cost-effective and environmentally-sound wastewater treatment system for the 201 Planning Area. To meet this requirement, alternate potential systems were developed and evaluated.

For the Central Hillsborough County - Tampa 201 Facility Planning Area, alternatives were developed for the Tampa Service Area and the County Service Area. A total of 34 treatment and disposal alternatives were developed and evaluated. Each alternative was evaluated with respect to cost, impacts on the natural and man-made environments, and operability. From this evaluation, twenty-four alternatives exhibited the greatest potential. These alternatives are discussed by service area in the following.

1. TAMPA SERVICE AREA (TSA)

The TSA consists of the Cities of Tampa and Temple Terrace and a portion of Hillsborough County. The TSA was divided into four Study Areas for the 201 Facility process: the Interbay Study Area; the Central Study Area; the Northeast Study Area; and the Eastern Study Area. These areas are shown in Figure 1. Due to the urbanization of the TSA and the operation of Tampa's wastewater collection and treatment facilities, treatment and disposal alternatives were developed for the TSA rather than individual study areas.

TREATMENT AND DISPOSAL ALTERNATIVES

All of the following alternatives for treatment and disposal of wastewater within the TSA assume that all wastes will be treated at Tampa's Hookers Point treatment facility. All alternatives assume that treatment design capacity will be increased to 100 mgd.

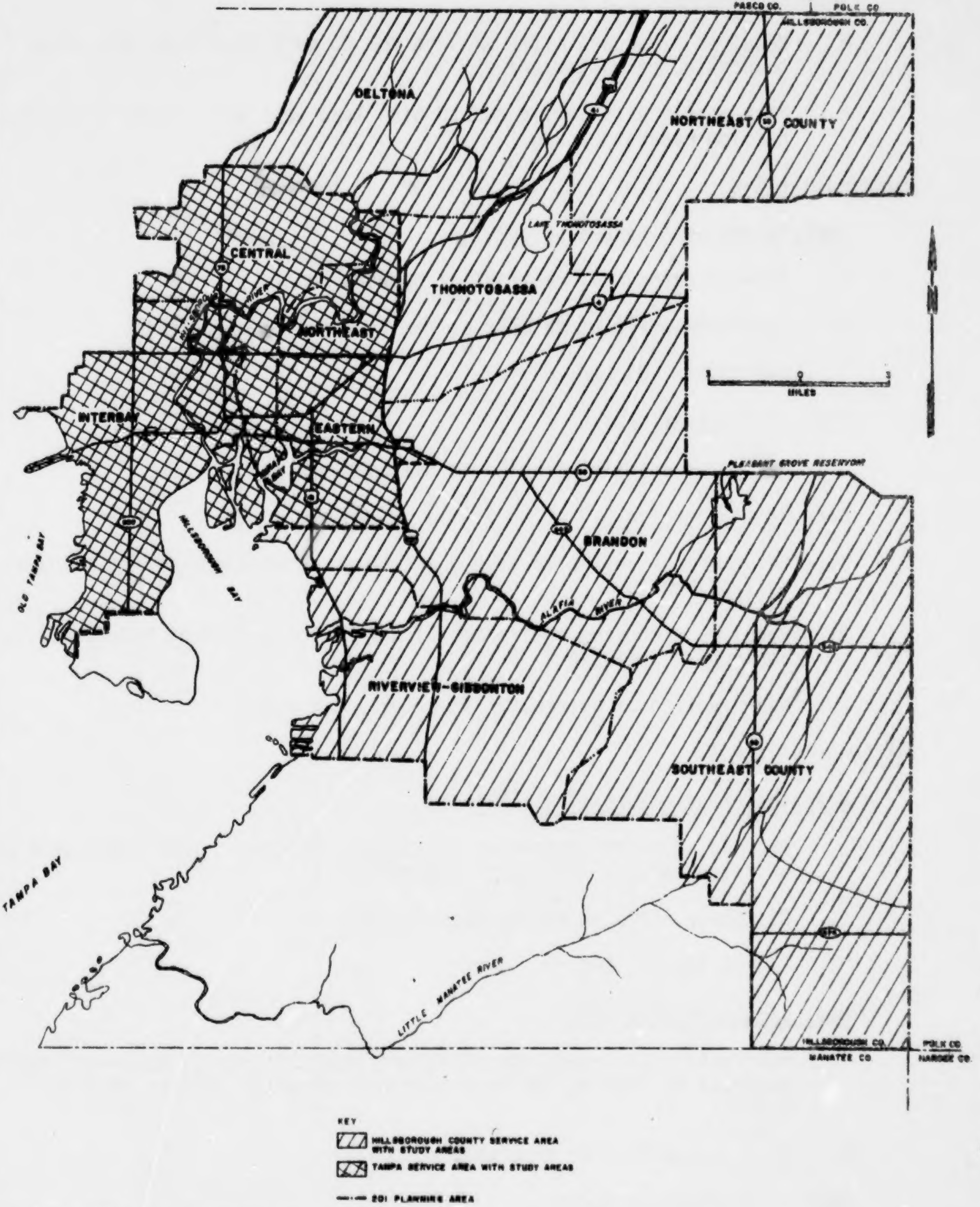
Alternative S-1

Description of Alternative S-1

1. Provide secondary treatment at Hookers Point.
2. Discharge effluent by spray irrigation.
3. Equivalent Annual Cost (EAC) of $24,851,000.

Pros of Alternative S-1

1. Possible recharge of ground water aquifer.
2. Decreased nutrient loading to Hillsborough Bay.


PASCO CO.
POLK CO.
HILLSBOROUGH CO.
DELTONA
NORTHEAST COUNTY
LAKE THONOTOSASSA
CENTRAL
THONOTOSASSA
HILLSBOROUGH RIVER
NORTHEAST
MILES
INTERBAY
EASTERN
PLEASANT GROVE RESERVOIR
HILLSBOROUGH BAY
OLD TAMPA BAY
BRANDON
ALAFIA RIVER
RIVERVIEW-GIBSONTON
SOUTHEAST COUNTY
TAMPA BAY
LITTLE MANATEE RIVER
HILLSBOROUGH CO.
POLK CO.
MANATEE CO.
HARDEE CO.
KEY
HILLSBOROUGH COUNTY SERVICE AREA WITH STUDY AREAS
TAMPA SERVICE AREA WITH STUDY AREAS
201 PLANNING AREA

SOURCE GREELEY AND HANSEN, SMITH AND GILLESPIE, 1979

CENTRAL HILLSBOROUGH COUNTY - TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

HILLSBOROUGH COUNTY AND CITY OF TAMPA SERVICE AREAS AND STUDY AREAS IN THE CENTRAL HILLSBOROUGH COUNTY - TAMPA 201 FACILITY PLANNING AREA

FIGURE 1

Cons of Alternative S-1

1. Requires 32 square miles of land due to soil conditions and large quantities of wastewater.
2. Most costly alternative due to high land cost and extensive pumping and holding capacity costs.

Alternative S-2

Description of Alternative S-2

1. Provide secondary treatment at Hookers Point.
2. Discharge effluent to Gulf of Mexico by an ocean outfall.
3. EAC of $22,623,000.

Pros of Alternative S-2

1. Decreased nutrient loading to Hillsborough Bay.

Cons of Alternative S-2

1. Not the most cost-effective due to high pumping costs from Tampa to the Gulf of Mexico.
2. Requires extensive environmental and hydrologic study before alternative could be undertaken.
3. No recycling of wastewater in water short area.

Alternative IDN-1

Description of Alternative IDN-1

1. Provide advanced wastewater treatment: treatment level to depend on wasteload allocation study in progress.
2. Discharge effluent to Hillsborough Bay.
3. EAC of $15,792,000.

Pros of Alternative IDN-1

1. Most easily implementable of alternatives because it does not involve purchase of land or the uncertain environmental effects of a Gulf outfall.
2. Most cost-effective alternative.

Cons of Alternative IDN-1

1. No recycling of wastewater in water short area.
2. No decrease in nutrient loading to Hillsborough Bay.

"No Action" Alternative

Description of No Action Alternative

1. No Federal action.
2. Continue use of septic tanks and package treatment plants to meet future demands.

Pros of No Action Alternative

1. No significant advantages.

Cons of No Action Alternative

1. Continued degradation of environment, primarily surface and ground waters.
2. Possible contamination of Hillsborough River and the City of Tampa's drinking water supply.
3. Local funding would require longer time frames for action.
4. Tampa's Hookers Point treatment facility will reach capacity in approximately the late 1980's.
5. Would encourage urban sprawl.

WASTEWATER COLLECTION AND TRANSMISSION ALTERNATIVES

Alternative 1

Description of Alternative 1

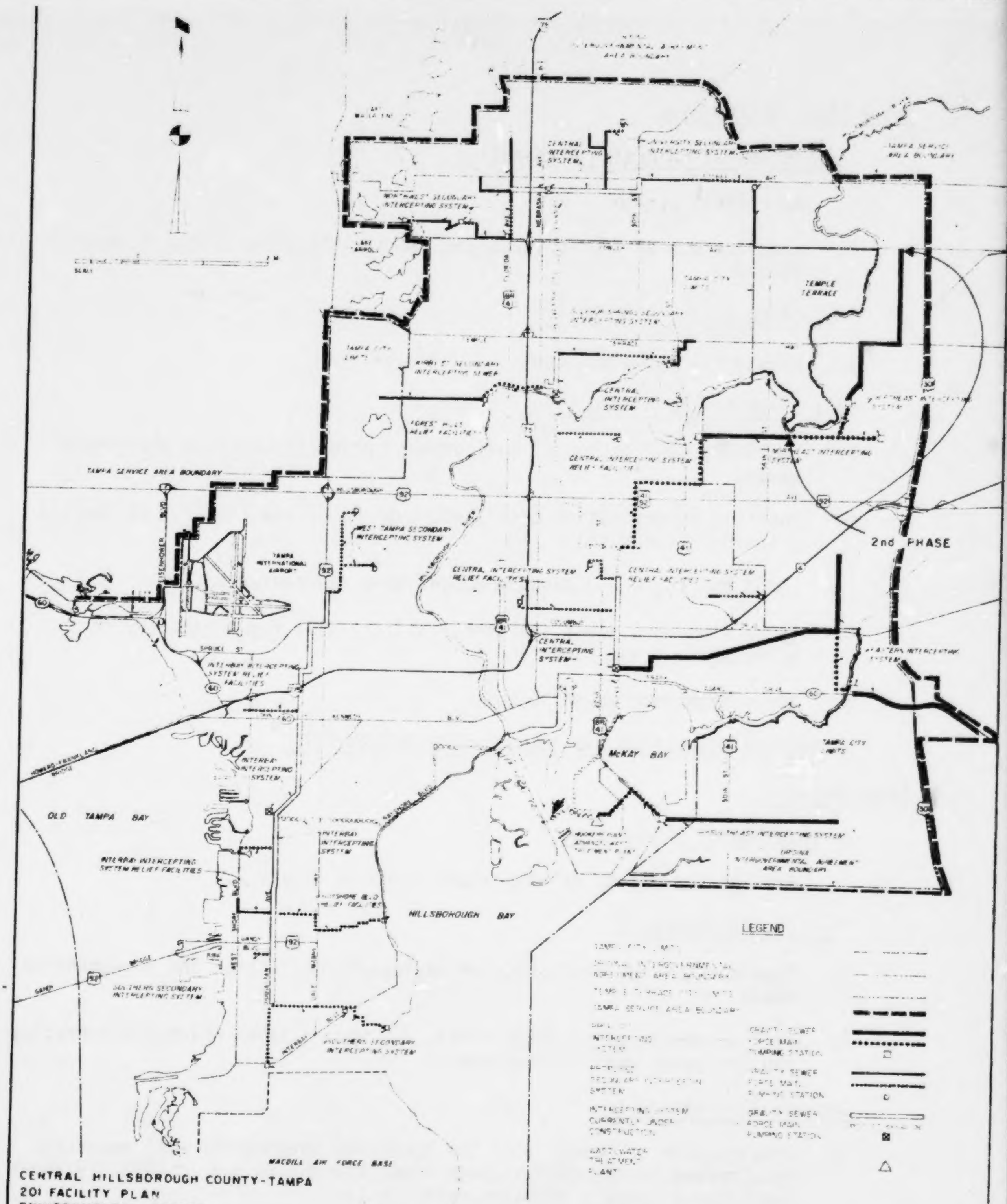
1. Provide service to all the areas shown in Figure 2.

Pros of Alternative 1

1. Provides current and projected wastewater collection and transmission needs.
2. Will eliminate all package plants and septic tanks which are currently causing water quality problems.

Cons of Alternative 1

1. Construction of Phase II of the Northeast Interceptor will encourage development in the Hillsborough River floodplain and immediately above the City of Tampa's drinking water intake.



SCALE
NORTHWEST SECONDARY INTERCEPTING SYSTEM
CENTRAL INTERCEPTING SYSTEM
UNIVERSITY SECONDARY INTERCEPTING SYSTEM
TAMPA SERVICE AREA BOUNDARY
LAKE CARROLL
NEBRASKA AVE
FLORIDA
FOWLER AVE
30th ST
TAMPA CITY LIMITS
TEMPLE TERRACE
SULPHUR SPRINGS SECONDARY INTERCEPTING SYSTEM
TEMPLE TERRACE
KIRBY ST. SECONDARY INTERCEPTING SEWER
CENTRAL INTERCEPTING SYSTEM
NORTHEAST INTERCEPTING SYSTEM
FOREST HILLS RELIEF FACILITIES
CENTRAL INTERCEPTING SYSTEM RELIEF FACILITIES
NORTHEAST INTERCEPTING SYSTEM
TAMPA SERVICE AREA BOUNDARY
HILLSBOROUGH
WEST TAMPA SECONDARY INTERCEPTING SYSTEM
2nd PHASE
TAMPA INTERNATIONAL AIRPORT
EISENHOWER BLVD
CENTRAL INTERCEPTING SYSTEM RELIEF FACILITIES
CENTRAL INTERCEPTING SYSTEM RELIEF FACILITIES
SPRUCE ST
CENTRAL INTERCEPTING SYSTEM
EASTERN INTERCEPTING SYSTEM
INTERBAY INTERCEPTING SYSTEM RELIEF FACILITIES
KENNEDY BLVD
HOWARD FRANKLAND BRIDGE
INTERBAY INTERCEPTING SYSTEM
McKAY BAY
TAMPA CITY LIMITS
OLD TAMPA BAY
INTERBAY INTERCEPTING SYSTEM
SOUTHEAST INTERCEPTING SYSTEM
ORIGINAL INTERGOVERNMENTAL AGREEMENT AREA BOUNDARY
INTERBAY INTERCEPTING SYSTEM RELIEF FACILITIES
BAYSHORE BLVD RELIEF FACILITIES
HILLSBOROUGH BAY
GANDY BRIDGE
SOUTHERN SECONDARY INTERCEPTING SYSTEM
SOUTHERN SECONDARY INTERCEPTING SYSTEM
MACDILL AIR FORCE BASE
60
92
41
301
75
LEGEND
TAMPA CITY LIMITS
ORIGINAL INTERGOVERNMENTAL AGREEMENT AREA BOUNDARY
TEMPLE TERRACE CITY LIMITS
TAMPA SERVICE AREA BOUNDARY
EXISTING INTERCEPTING SYSTEM
GRAVITY SEWER
FORCE MAIN
PUMPING STATION
PROPOSED SECONDARY INTERCEPTING SYSTEM
GRAVITY SEWER
FORCE MAIN
PUMPING STATION
INTERCEPTING SYSTEM CURRENTLY UNDER CONSTRUCTION
GRAVITY SEWER
FORCE MAIN
PUMPING STATION
WASTEWATER TREATMENT PLANT

CENTRAL HILLSBOROUGH COUNTY-TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

TAMPA SERVICE AREA
PROPOSED EXPANSION OF INTERCEPTING AND SECONDARY INTERCEPTING SYSTEMS

SOURCE:

SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

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DAMES & MOORE

FIGURE 2

Alternative 2

Description of Alternative 2

1. Same as Alternative 1 except does not include construction of the second phase of the Northeast Interceptor. Phase I of the Northeast Interceptor will be down-sized accordingly.

Pros of Alternative 2

1. EPA does not participate in encouragement of development in Hillsborough River floodplain and immediately above the City of Tampa's drinking water intake.

2. This position could encourage Hillsborough County to institute land use controls for all floodplains and to protect their drinking water supply.

Cons of Alternative 2

1. Potential long range degradation of water quality in Hillsborough River if development proceeds and significant septic tank failures develop. The County's past and present land use control policies indicate that development would be allowed to proceed.

2. COUNTY SERVICE AREA (CSA)

For the purpose of the 201 Facility Planning process, the CSA was divided into six study areas: the Deltona Study Area; the Thonotosassa Study Area; the Brandon Study Area; the Riverview-Gibsonton Study Area; the Northeast County Study Area; and the Southeast County Study Area. These areas are shown in Figure 1. Alternatives developed for these study areas are listed in the following. The Northeast County and Southeast County Study Areas were not included in the alternative evaluation because of their small population, lack of wastewater management needs and lack of substantial projected population increases.

DELTONA STUDY AREA

Alternative D1

Description of Alternative D1

1. Construct treatment plant in study area to treat 1.3 mgd of wastewater.

2. Provide secondary treatment with wetlands disposal of effluent.

3. EAC of $742,000.

Pros of Alternative D1

1. Provides recycling/reuse of water.

Cons of Alternative D1

1. Most costly alternative.

2. Sewering of area would be premature due to undeveloped nature of area.

3. Could prematurely encourage development of area.

4. Inoperative system would degrade water quality of the Hillsborough River, the source of Tampa's drinking water supply.

Alternative D3

Description of Alternative D3

1. Construct pump station and force main to convey 1.3 mgd of wastewater to the Tampa wastewater system for treatment and disposal.

2. EAC of $675,000.

Pros of Alternative D3

1. Most environmentally-sound alternative, assuming development will proceed with or without sewers.

2. Most cost-effective alternative.

Cons of Alternative D3

1. Sewering of this area would be premature due to undeveloped nature of area.

2. Could prematurely encourage development of area.

3. Does not reuse/recycle wastewater.

"No Action" Alternative

Description of No Action Alternative

1. No Federal action.

2. Construction costs of a pump station and connection to Tampa wastewater system would probably be paid by planned developer of area.

3. Planned developer would also pay percentage cost of 1.3 mgd treatment capacity at Hookers Point facility.

Pros Of No Action Alternative

1. No Federal funds spent on developmental sewer.

2. No Federal funds spent to encourage development in wetland and floodplain areas.

Cons of No Action Alternative

1. No significant objections to this option.

THONOTOSASSA STUDY AREA

Alternative T1

Description Of Alternative T1

1. Construct treatment plant in study area to treat 0.55 mgd of wastewater.
2. Provide secondary treatment of wastewater and dispose by spray irrigation.
3. EAC of $820,000.

Pros of Alternative T1

1. Provides for reuse/recycling of water.

Cons of Alternative T1

1. Not the most cost-effective alternative.
2. No current or projected short-term needs for service have been demonstrated.

Alternative T3

Description of Alternative T3

1. Construct pump stations and force mains to convey 0.55 mgd of wastewater to the Tampa wastewater system for treatment and disposal.
2. EAC of $813,000.

Pros of Alternative T3

1. Most cost-effective alternative.

Cons of Alternative T3

1. No current or projected short-term need for a centralized system has been demonstrated.

"No Action" Alternative

Description of No Action Alternative

1. No Federal action.
2. Rely on use of septic tanks for further development until the need for a regional system can be demonstrated.

Pros of No Action Alternative

1. No demonstrated water quality problems.

2. Very limited development with no major population increases projected for at least the next 10 years. 201 Plan does not project need for service until after 1990.

Cons of No Action Alternative

1. No significant problems with this alternative identified.

BRANDON STUDY AREA

Alternatives for the treatment and disposal of wastewater within the Brandon Study Area are described in the following.

Alternative B3

Description of Alternative B3

1. Construct treatment plant within the study area to treat up to 9.7 mgd of wastewater.

2. Provide secondary treatment and disposal of effluent by spray irrigation.

3. EAC of $6.47 million.

Pros of Alternative B3

1. Most cost-effective alternative.

2. Recycles wastewater.

3. First phase already constructed by County.

Cons of Alternative B3

1. Site specific studies will need to be completed before final approval can be given.

Alternative B5

Description of Alternative B5

1. Construct treatment plant within the study area to treat up to 9.7 mgd of wastewater.

2. Provide secondary treatment plus nitrification with discharge of effluent to the Alafia River.

3. EAC of $6.66 million.

Pros of Alternative B5

1. Provides needed treatment capacity.

Cons of Alternative B5

1. Not most cost-effective alternative.

2. Does not reuse/recycle wastewater.

Alternative B13

Description of Alternative B13

1. Construct force mains and pumping stations to convey up to 9.7 mgd of wastewater to Tampa's wastewater system for treatment and disposal.
2. EAC of $8.9 million.

Pros of Alternative B13

1. Provides needed treatment capacity.
2. Less environmental risk.
3. Reduces nutrient loading to Alafia River.

Cons of Alternative B13

1. The most costly alternative.
2. Does not recycle wastewater.

"No Action" Alternative

Description of No Action Alternative

1. No Federal action.
2. Continue use of percolation ponds and septic tanks to satisfy future demand.

Pros of No Action Alternative

1. No significant advantages.

Cons of No Action Alternative

1. Not cost-effective due to operation and maintenance costs associated with numerous facilities.
2. Potential long-term nitrate build-up in area of direct recharge to Floridan aquifer.

Alternatives for wastewater collection and transmission within the Brandon Study Area are described in the following.

Alternative 1

Description of Alternative 1

1. Provide service to all planned phases.

Pros of Alternative 1

1. Provides service to Hillsborough County's disaggregation of approved population projections.

Cons of Alternative 1

1. Extensive areas projected for service in the future where service is not now justified.

Alternative 2

Description of Alternative 2

1. Do not provide sewer service for existing septic areas or areas suitable for septic tank development in the future.
2. Provide planning approval now only to phases scheduled for construction by 1990.
3. Delay planning approval on additional phases until results of 1990 census are available and need can be justified.

Pros of Alternative 2

1. No service now approved where need is not now justified.
2. Urban sprawl will not be encouraged. The County has given so many development approvals that it is difficult to project at this time exactly where development will go beyond 1990.

Cons of Alternative 2

1. Plan approval is not now given for approved 20 year population projection.

RIVERVIEW-GIBSONTON STUDY AREA

Alternatives for wastewater treatment and disposal for the Riverview-Gibsonton Study Area are discussed in the following.

Alternative RG1

Description of Alternative RG1

1. Construct treatment plant in the study area to treat 6.95 mgd of wastewater.
2. Provide secondary treatment with nitrification with discharge of effluent to Alafia River.
3. EAC of $4.0 million.

Pros of Alternative RG1

1. Provides needed treatment capacity.

Cons of Alternative RG1

1. Not most cost-effective alternative.
2. Does not reuse/recycle wastewater.

Alternative RG4

Description of Alternative RG4

1. Construct treatment plant in the study area to treat 6.95 mgd of wastewater.
2. Provide secondary treatment with disposal of effluent by spray irrigation.
3. EAC of $3.8 million.

Pros of Alternative RG4

1. Provides needed treatment capacity.
2. Reuses/recycles wastewater.

Cons of Alternative RG4

1. Not most cost-effective alternative.
2. Site specific studies must be performed before final approval can be given.

Alternative RG6

Description of Alternative RG6

1. Construct force mains and pumping stations to convey wastewater to the Tampa wastewater system for treatment and disposal.
2. EAC of $4.8 million.

Pros of Alternative RG6

1. Provides needed treatment capacity.
2. Reduces nutrient loading to Alafia River.

Cons of Alternative RG6

1. Not the most cost-effective alternative.
2. Does not reuse/recycle wastewater.

Alternative RG7

Description of Alternative RG7

1. Construct force mains and pumping stations to convey wastewater to proposed treatment facilities in the Hillsborough South 201 Planning Area.
2. Effluent to be disposed by spray irrigation.
3. EAC of $3.7 million.

Pros of Alternative RG7

1. Provides needed treatment capacity.
2. Recycles/reuses wastewater.
3. Most cost-effective alternative.
4. Reduces nutrient loading to Alafia River.

Cons of Alternative RG7

1. Site specific studies must be completed before final approval can be given.

"No Action" Alternative

Description of No Action Alternative

1. No Federal action.
2. Rely on continued use of percolation ponds and septic tanks to meet future needs.

Pros of No Action Alternative

1. No significant advantages.

Cons of No Action Alternative

1. Soil conditions not suitable for on-lot disposal.
2. Continued degradation of Alafia River and its tributaries.

Alternatives for wastewater collection and transmission within the Riverview-Gibsonton Study Area are discussed in the following.

Alternative 1

Description of Alternative 1

1. Provide services to all planned phases.

Pros of Alternative 1

1. Provides service to Hillsborough County's disaggregation of approved population projections.

Cons of Alternative 1

1. Extensive areas projected for service in the future where not now justified.

Alternative 2

Description of Alternative 2

1. Provide planning approval now only to phases scheduled for construction by 1990.
2. Delay planning approval on additional phases until results of 1990 census are available and need can be justified.

Pros of Alternative 2

1. No service now approved where need is not now justified.
2. Urban sprawl will not be encouraged. The County has given so many development approvals that it is difficult to project at this time exactly where development will go beyond 1990.

Cons of Alternative 2

1. Plan approval is not now given for approved 20 year population projection.

PART C: PREFERRED ALTERNATIVE

After the development and careful evaluation of project alternatives, the preferred alternatives for the TSA and CSA were selected which were considered to be the best combination of being environmentally acceptable, cost-effective and implementable. These alternatives are identified and summarized in the following sections.

All of the alternatives were designed to serve the needs of the population projected for the year 2000. Because the study area needs were based on projected population increases, the design conditions used for evaluation of alternatives should not be realized until the year 2000. Therefore, a phased approach to the construction of facilities was developed to meet the wastewater collection, treatment and disposal needs of the area as the wastewater flows increase. The phases of the program were developed to allow maximum use of existing sewerage facilities and greater utilization of new facilities during their design lifetime.

Discussion of the preferred alternatives by phases is discussed in detail in the EIS and is beyond the intent of this summary. In general, for the selected alternatives, the first phase of construction is limited to areas which are already substantially developed and/or to correct deficiencies in existing sewerage systems.

1. TAMPA SERVICE AREA

Wastewater Treatment and Disposal

The preferred alternative is the discharge of treated wastewater to Hillsborough Bay. The exact level of treatment will be based upon the results of a wasteload allocation study. While this alternative does continue the previously established pattern of discharge to Hillsborough Bay, it does recognize substantial improvements in water quality given the operations of the Hookers Point AWT plant and does not preclude future recycling or reuse options. Possible means for reuse of Hookers Point wastewater will be pursued throughout the remainder of the EIS/201 process.

Wastewater Collection and Transmission

The preferred alternative is the provision of service to all areas as shown in Figure 1 excluding the second phase of the Northeast Interceptor. This option will provide the most cost-effective and environmentally sound system for the TSA without encouraging development in the Hillsborough River floodplain and above the City of Tampa's water supply intakes.

2.0 COUNTY SERVICE AREA

Deltona Study Area

The preferred alternative for wastewater collection, treatment and disposal in the Deltona Study Area is the "No Action" alternative. This alternative precludes the use of Federal funds to encourage development in a wetlands environment. This alternative also is consistent with expending grant funds to clean-up water quality problems rather than promoting development since water quality problems have not been demonstrated to exist.

Thonotossa Study Area

The preferred alternative for wastewater collection, treatment and disposal in the Thonotosassa Study Area is the "No Action" alternative. This alternative precludes the use of Federal funds to encourage development in an area where no water quality problems exist or are projected to exist. The need for provision of service in this area should be evaluated after the 1990 census.

Brandon Study Area

The preferred alternative for wastewater treatment and disposal for the Brandon Study Area is Alternative B3, construction of a treatment plant with secondary treatment and disposal of effluent by spray irrigation. This alternative is the most cost-effective, provides the needed treatment capacity and recycles wastewater. Site specific analysis will be needed to verify the environmental suitability of each proposed site.

The preferred alternative for wastewater collection and transmission is that which provides plan approval now only to phases scheduled for construction by 1990 and provides for continuation of existing and future development on septic tanks. Planning approval on additional phases will be delayed until results of the 1990 census are available and a need can be justified. Hillsborough County has given approvals to land developments which far exceed the projected population levels. It is difficult to tell now which of these plans will be the most economically viable and where major population concentrations will be in 1990. No significant water quality problems have been identified which would justify the expenditure of funds for serving septic tank areas. The 201 consultant will evaluate each area now on septic tanks to determine the need for service. Monitoring of nitrate levels in area water supply wells will continue to identify any future build-up which would necessitate the need for sewer service.

Riverview-Gibsonton Study Area

The preferred alternative for treatment and disposal of wastewater in the Riverview-Gibsonton Study Area is Alternative RG7, which involves pumping to the proposed South County facilities for treatment and disposal by spray irrigation. This alternative is the most cost-effective, provides needed treatment capacity and provides for recycling of wastewater. Site specific analysis will be needed to verify the environmental suitability of each proposed site.

The preferred alternative for the collection and transmission of wastewater in the Riverview-Gibsonton Study Area is that which provides for plan approval now only to phases scheduled for construction by 1990. Planning approval on additional phases will be delayed until results of the 1990 census are available and need can be justified. Hillsborough County has given approval to land developments which far exceed the projected population levels. It is difficult to tell now which of these plans will be the most economically viable and where major population concentrations will be following 1990.

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CHAPTER I - PURPOSE OF AND NEED FOR ACTION

PART A: PURPOSE OF THE EIS

Concerns within the past decade for preservation of the integrity of the environment led to the adoption of Public Law 91-190, the National Environmental Policy Act (NEPA) of 1969. Within this Act are the national environmental policies and goals intended to mitigate mistakes of the past through careful and coordinated planning efforts. As stated in the law the following declaration was issued: "a national policy shall be established which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological system and natural resources important to the Nation ...".

In striving to meet these above stated goals P.L. 91-190 stipulates: "...include in every recommendation a report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on the environmental impact of the proposed action; and adverse environmental effects which cannot be avoided should the proposal be implemented; and alternatives to the proposed actions...". From this legislation arises the basic framework for the use of the Environmental Impact Statement (EIS).

The purpose of this particular EIS is to inform the public of potential impacts which may result from the proposed Federal action, i.e., the construction of wastewater facilities, and to enable public participation in the decision-making process. The EIS is intended to resolve conflicts in the study area between wastewater disposal and the natural resources which exist in the area.

The EIS proposes to develop a preferred alternative for wastewater facilities in the study area. This alternative resolves many of those conflicts and will minimize environmental impacts throughout the study area.

PART B: BACKGROUND AND ISSUES

The Central Hillsborough County - Tampa 201 Facility Planning Area Environmental Impact Statement is being prepared to address the provision of wastewater management facilities for a portion of Hillsborough County and the Cities of Tampa and Temple Terrace, Florida. Sewerage facilities which currently service the Planning Area are provided through either privately-owned franchises or through utilities owned and operated by Hillsborough County, the City of Tampa or the City of Temple Terrace. In general, the existing wastewater management system is incapable of meeting future needs without serious degradation of the environment.

The Central Hillsborough County - Tampa 201 Facility Planning Area (Planning Area) is located on the central west coast of Florida. The boundaries of the Planning Area were established by the Florida Department of Environmental Regulation. The Planning Area was divided into the County Service Area and the Tampa Service Area for planning purposes. The City of Tampa was responsible for planning within the Tampa Service Area which includes the City of Tampa, the City of Temple Terrace, and the area defined by a 1967 agreement between the City and County and referred to as the Original Intergovernmental Agreement Area or OIGAA. Planning in the remainder of the Planning Area was the responsibility of Hillsborough County.

The service areas were further divided into study areas to facilitate planning for future wastewater collection, treatment and disposal needs, as shown on Figure I-1. Study areas were established based on consideration of existing wastewater facilities, topography, future land use, census tracts and political boundaries. Additionally, study areas were subdivided into sewer districts to identify needs for sewer service.

The major population centers within the Planning Area are the Cities of Tampa and Temple Terrace, both located within the Tampa Service Area (TSA). The 1978 population estimate for the TSA is 396,929 people. Approximately sixty percent of the TSA is presently sewered. However, portions of this system are undersized for the current wastewater flows and others are no longer serviceable due to structural deterioration. Wastewater is treated at the City of Tampa's treatment facilities located at Hookers Point. This facility provides advanced wastewater treatment with the treated effluent discharged into Hillsborough Bay.

The County Service Area (CSA) is sparsely populated with the exception of the Brandon and Riverview-Gibsonton areas. Septic tanks and package treatment plants have been used extensively to provide wastewater areas. Septic tanks and package treatment plants have been used extensively to provide wastewater treatment. The CSA contains a total of 80 package treatment plants. Portions of the Brandon area are served by a wastewater collection system and owned and operated by Hillsborough County. Wastewater collected by this system is conveyed to the City of Tampa's Hookers Point treatment facility.

The Clean Water Act of 1977, represents the major legislative action for water pollution abatement in the United States. Under this legislation the U.S. Environmental Protection Agency has been given responsibility for the administration of the law including the funding of wastewater facilities.

The principal mechanism in P.L. 95-217 which provides for the construction of municipal wastewater treatment plants is Section 201. This Section provides grant funds for the planning, design and construction of wastewater facilities. Under the provision of Section 201 any wastewater facility which is newly proposed or under consideration for upgrading and or expanding which will use federal funds for construction must first proceed with a 201 Facilities Planning Study.

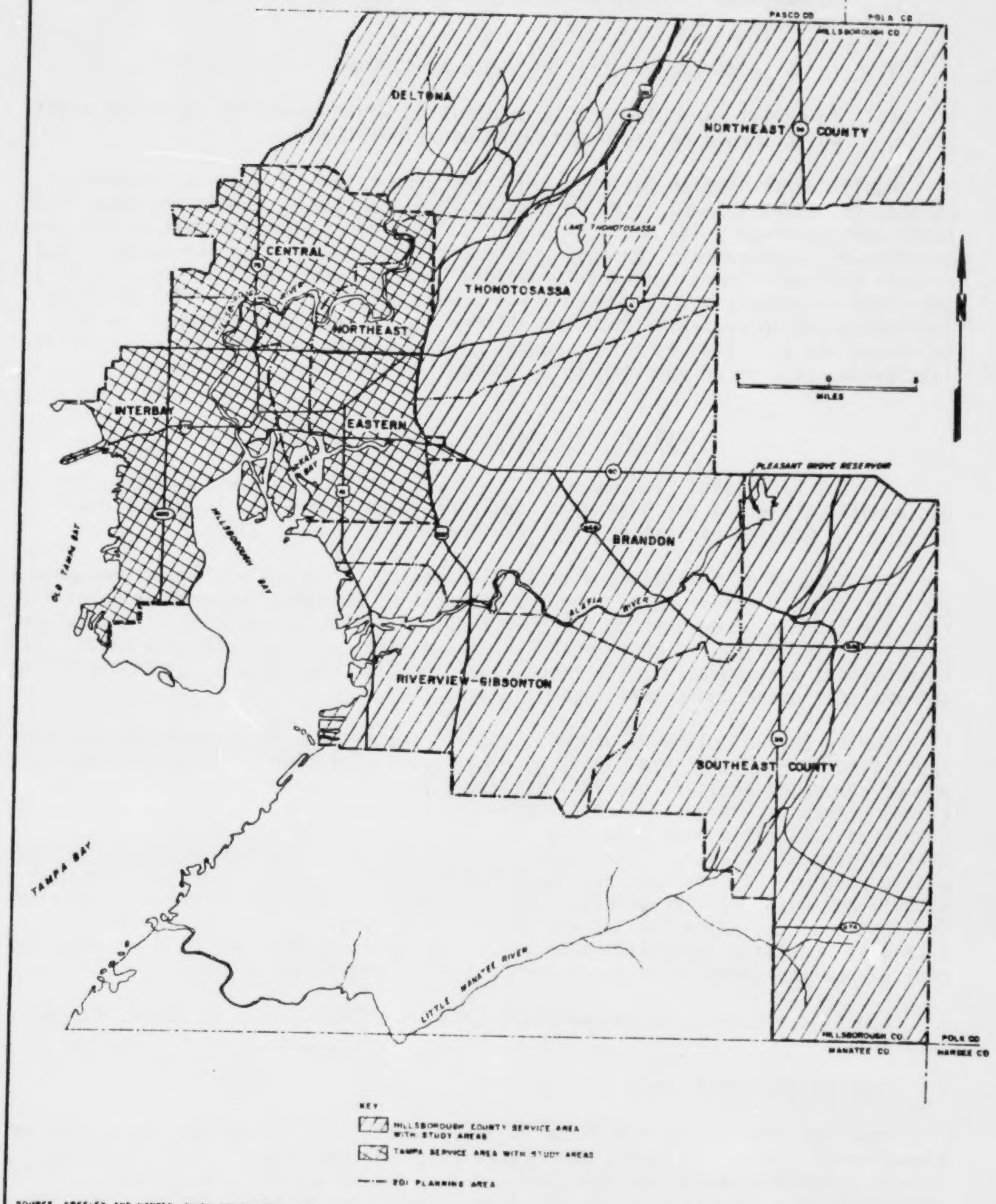
In 1978, EPA granted Step I funding for preparation of the Central Hillsborough County - Tampa Area 201 Facilities Plan. The City of Tampa and Hillsborough County have been coordinating the 201 Facilities Plan for the study area. Smith & Gillespie Engineers, Inc. of Jacksonville, Florida and Greeley & Hansen of Tampa, Florida were granted approval to begin preparation of the 201 Facilities Plan in October, 1978.

Due to the environmental complexities in the study area and the financial and management constraints of the applicants, EPA made the decision to prepare an EIS in conjunction with the 201 Facilities Plan. Dames & Moore was authorized to begin preparation of the EIS in March, 1979.

The objective of the EIS and 201 Facilities Plan process is the selection of the most cost-effective, environmentally sound, socially acceptable and implementable wastewater management system for the Planning Area. To meet this objective, certain major goals were determined to be significant:

1. To upgrade or replace deficient treatment and septic systems.

I-3


PASCO CO
POLK CO
HILLSBOROUGH CO
DELTONA
NORTHEAST COUNTY
LAKE THONOTOSASSA
CENTRAL
THONOTOSASSA
NORTHEAST
N
MILES
INTERBAY
EASTERN
PLEASANT GROVE RESERVOIR
OLD TAMPA BAY
HILLSBOROUGH BAY
BRANDON
ALAFIA RIVER
RIVERVIEW-GIBSONTON
SOUTHEAST COUNTY
TAMPA BAY
LITTLE MANATEE RIVER
HILLSBOROUGH CO
POLK CO
MANATEE CO
HARDEE CO
KEY
HILLSBOROUGH COUNTY SERVICE AREA WITH STUDY AREAS
TAMPA SERVICE AREA WITH STUDY AREAS
201 PLANNING AREA

SOURCE GREELEY AND HANSEN, SMITH AND GILLESPIE, 1979

CENTRAL HILLSBOROUGH COUNTY - TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No C120634010

HILLSBOROUGH COUNTY AND CITY OF TAMPA
SERVICE AREAS AND STUDY AREAS IN THE
CENTRAL HILLSBOROUGH COUNTY - TAMPA
201 FACILITY PLANNING AREA

DAMES & MOORE

FIGURE I-1

2. To minimize the adverse effects of the disposal of large volumes of wastewater.
3. To maximize the benefits of wastewater reuse.
4. To assist land planners in determining environmentally sensitive areas which should be protected from future development.

Public participation was encouraged throughout the 201 planning process through the establishment of a Citizens Advisory Committee, public meetings, and local news coverage. The Advisory Committee included representatives of all local governments, environmental groups, regional regulatory and planning agencies and private citizens. Meetings of the Advisory Committee were held at key intervals in the planning process and committee members were provided with a series of study memorandums which presented detailed information on principal parts of the study. Following the selection of a recommended plan, a public meeting was held to afford interested citizens an opportunity to comment on the plan.

PART C: 201 FACILITIES PLAN SUMMARY

The 201 Facilities Plan was developed by Smith & Gillespie Engineers, Inc. of Jacksonville, Florida and Greeley & Hansen of Tampa, Florida. The Final Draft portions of the 201 Facilities Plan were completed in July, 1980.

The purpose of the 201 Facilities Plan was to provide a wastewater management plan for the collection, treatment and disposal of estimated wastewater quantities from the Planning Area through the year 2000. Alternative projects were developed to satisfy the projected wastewater collection, treatment and disposal needs. The alternatives were compared with respect to economic, environmental, administration and implementation characteristics.

During the 201 planning process, specific wastewater management problems were identified in the Tampa and County Service Areas. Solution of these problems was one of the major goals of the 201 Facility Plan. The major problem within the Planning Area is the quality of surface waters in the area. Several water quality standards violations have been cited by regulatory agencies in the area. Over-enrichment of area surface waters from fertilizers and from human and animal wastes have been assessed by the Tampa Bay Regional Planning Council as the most significant water quality problem. Some wastewater treatment plants, malfunctioning septic tanks, animal wastes and various other sources have contributed to excessive quantities of coliform bacteria found in some area waters, over-enrichment of surface waters and low concentrations of dissolved oxygen.

Specific problems within each service area are identified in the following sections.

1. TAMPA SERVICE AREA (TSA)

Over one-half of the TSA is serviced by an existing wastewater collection and transmission system. However, the system requires substantial improvements to provide hydraulic relief for overloaded sewers and to correct structural deterioration of sewers that are no longer serviceable or where hydrogen sulfide attack has occurred. Projects now under construction or planned as part of Tampa's Fourth Wastewater Improvement Program (4-WIP) will provide the hydraulic relief necessary in some existing sewers through flow diversion. Other existing sewers will require relief by replacement or parallel pipeline. Sewers with structural deficiencies will generally require replacement.

The hydraulic and structural deficiencies in the existing collection system have resulted in overflows into the Hillsborough River, streets, drainage canals and some bay waters. Additionally, disruptions in service and some local flooding has occurred. These deficiencies cause the periodic release of untreated wastewater from the collection system and, therefore, significantly compromise the effective operation of the system.

Areas available for further development within the TSA are generally unsuited for the use of septic tanks for wastewater disposal due to soils with low permeability, high water table or location within a floodplain. One potential area of future development is the Hillsborough River floodplain upstream of the City of Tampa water supply intake. The possible malfunctioning of septic tank systems in this area pose a potential threat to Tampa's water supply.

2. COUNTY SERVICE AREA (CSA)

The northern and southeastern portions of the County Service Area are sparsely populated and wastewater is disposed through the use of septic tank and drainfield systems. However, the central and southern portions of the CSA in the Brandon and Riverview-Gibsonton areas are more developed. Wastewater in these areas are treated and disposed through the use of septic systems or package treatment plants. Portions of the Brandon area are served by a sewer system owned by the County. This system conveys wastewater to the City of Tampa for treatment.

The Brandon Sewer System includes an extensive system of manifold force mains and numerous pumping stations as a result of rapid population growth in the area. This system is approaching its design capacity and further expansion could result in major operational problems.

Package treatment plants have been used extensively for commercial establishments, apartment complexes, schools and some subdivisions. Presently, there are 80 package treatment plants within the CSA. The majority of these facilities consist of extended aeration treatment plants and percolation ponds for effluent disposal.

The operational history of many of the package treatment plants is not good. This, combined with the large number of plants and the density of septic tanks has resulted in scattered local contamination of ground water and surface water in the Brandon and Riverview-Gibsonton areas. Analysis of water samples from the Brandon municipal water supply well field indicates slightly elevated nitrate concentrations which are attributed to septic tanks in the area, as well as percolation ponds and non-point source runoff. The continued use of septic systems in the Riverview-Gibsonton area is not considered feasible because of the unsuitability of the soils in this area.

CHAPTER II - ALTERNATIVES: DEVELOPMENT AND EVALUATION

PART A: INTRODUCTION

The purpose of this chapter is to provide a systematic development of all reasonable alternatives for the attainment of the objectives of this project and to compare these alternatives with the aim of identifying critical differences and selecting an alternative.

This chapter presents a range of structural engineering alternatives and non-structural considerations for the solution of wastewater management problems. In addition, alternatives are evaluated for their engineering and environmental feasibility. The structural alternatives identified include the construction of new wastewater treatment and conveyance facilities or the upgrading of existing facilities. Non-structural wastewater considerations discussed include optimum use of existing facilities, flow and waste reduction measures, land and development controls.

Based on an agreement reached between the County, City, Tampa Bay Regional Planning Council, Florida Department of Environmental Regulation (FDER) and EPA, population projections included in Hillsborough County's Horizon 2000 Plan coupled with projections made by the University of Florida were used as the basis for future development and wastewater flow projections within the planning area. These population projections indicate that the population of the Planning Area will increase by almost 220,000 people from 1980 to 2000, broken down as follows:

	1980	2000
Tampa Service Area	410,209	543,000
County Service Area	106,730	193,500
TOTAL	516,939	736,500

The population projections for the Tampa and County Service Areas were distributed to the various study areas and sewer districts to permit evaluation of the adequacy of existing wastewater facilities and to identify requirements for additional wastewater facilities. Land use, population growth and other studies were used to estimate future wastewater quantities requiring facilities for collection, treatment and disposal during the planning period. Wastewater quantities estimated for the year 2000 are 96.44 mgd in the TSA and 17.52 mgd in the CSA.

The needs and expenditures for wastewater facilities will be substantial and, therefore, many technically feasible alternatives were evaluated for immediate and future requirements throughout the planning period. In addition, in the Tampa Service Area, previous studies of the collection system were reviewed and requirements were modified as necessary to conform to 201 planning criteria. Collection system projects were developed to provide sewer service for unsewered existing development and areas of estimated future development and to remedy deficiencies identified in existing intercepting and secondary intercepting systems.

All potential alternatives were evaluated based on capital and annual costs. The cost evaluations identified several cost-effective alternatives for the Tampa Service Area and the County Service Area. The cost-effective alternatives were evaluated further with respect to overall economic, environmental and administration and implementation characteristics to select the recommended plan.

PART B: IDENTIFICATION AND DEVELOPMENT OF ALTERNATIVE WASTEWATER SERVICE CONFIGURATIONS AND SYSTEMS

The development of alternatives for wastewater treatment in the Central Hillsborough County - Tampa 201 Facility Planning Area is accomplished in two phases. The first consists of developing alternative wastewater service configurations. A service configuration is a distinct plan for providing wastewater treatment and disposal services to each study area, either by local treatment/disposal, or joint treatment/disposal by two or more study areas. It does not include options for the actual treatment and disposal methods but rather conveyance configurations and disposal locations.

The development of these service configuration alternatives first involves determining the wastewater generated in the study areas and then identifying various combinations of two or more study areas for which joint treatment/disposal appears to have economic and/or environmental advantages over local treatment/ disposal and, therefore, requires further evaluation. Finally, the alternative service configurations for the area are established by the combination of local and joint wastewater treatment/disposal service schemes.

The second phase of alternatives development involves screening various wastewater treatment/disposal techniques for applicability in the Central Hillsborough County - Tampa 201 Facilities Planning Area and generating treatment/disposal options for local treatment/disposal at each study area as well as for each joint treatment combination (joint treatment/disposal) which appears in the service configuration alternatives. These treatment/disposal options provide only for the level of treatment (e.g., secondary or advanced secondary) and for the method of disposal (e.g., discharge to surface waters or spray irrigation).

This two-phase approach is intended to provide increased understanding of the alternatives development method as well as ease of evaluation. The cost-effective evaluation of individual local and joint wastewater treatment/disposal options is completed as a first evaluation step. Recommended cost-effective options are incorporated into the service configurations to formulate a limited number of wastewater management alternatives for final evaluation.

1. ALTERNATIVE WASTEWATER SERVICE CONFIGURATIONS

The Planning Area was divided into two service areas, the Tampa Service Area (TSA) and the County Service Area (CSA) for the 201 Facilities Planning process. The service areas were further broken down into study areas as shown in Figure I-1.

Portions of the TSA are currently served by wastewater collection and treatment facilities. In 1951, the City of Tampa began construction of a 36 mgd primary treatment plant at Hookers Point. Recently, the Hookers Point treatment plant was upgraded to provide advanced wastewater treatment at a rated annual average hydraulic capacity of 60 mgd. This capacity is considered sufficient to meet projected wastewater needs until the late-1980's.

Because of the existing collection and treatment facilities within the TSA, no other service configurations were developed for the TSA.

Service configurations for collection and treatment of wastewater were developed for four of the six study areas within the CSA. The study areas included were the Deltona, Thonotosassa, Brandon and Riverview-Gibsonton Study Areas. The Northeast County and Southeast County Study Areas were not included in the development of service configurations because of: existing low population density; lack of wastewater management problems; and, projected low population density.

Two service configurations were developed for the Deltona and Thonotosassa Study Areas: collect and treat wastewater within the respective study areas; and, collect and pump wastewater from each study area to the TSA for treatment at the Hookers Point treatment facility. In addition to these two service configurations, a third configuration was developed for the Brandon and Riverview-Gibsonton Study Areas: treat a portion or all of the study area's wastewater within the study area and convey the remainder to the TSA for treatment. A fourth configuration was developed for the Riverview-Gibsonton Study Area which included pumping of wastewater to treatment and disposal facilities in the Hillsborough County South 201 Planning Area.

2. IDENTIFICATION OF APPLICABLE TREATMENT AND DISPOSAL METHODS

For each of the local or joint treatment/disposal schemes identified, alternative treatment and disposal methods must be developed. This section identifies and evaluates various treatment and disposal methods for application in the Planning Area.

Treatment and Discharge To Surface Waters

Wastewater treatment and discharge to surface waters is the most commonly used wastewater management technique. It consists of treating wastewater by a combination of physical, chemical and/or biological processes and discharging the effluent to a receiving stream via an outfall.

In the Central Hillsborough County - Tampa Planning Area, the City of Tampa's Hookers Point treatment facility discharges effluent to Hillsborough Bay. In the past, this discharge has contributed significantly to the over-enrichment of the bay waters. However, with the initiation of the advanced wastewater treatment facilities, bay water quality is expected to improve.

The minimum degree of treatment in the State of Florida is secondary treatment (403.086 Florida Statutes). Secondary treatment is defined as a minimum of 90 percent removal of 5-day BOD and suspended solids. In the Tampa area, the Wilson - Grizzle Act (403.086 Florida Statutes) requires that treatment plants that discharge effluents into designated surface waters in the Tampa Bay area must provide treatment based on the results of individual wasteload allocation studies. Prior to mid-1981, the Wilson-Grizzle Act required that these treatment plants provide advanced wastewater treatment (defined as effluent containing not more than 5 mg/l 5-day BOD, 5 mg/l suspended solids, 3 mg/l total nitrogen as N, and 1 mg/l total phosphorous as P). Included in these designated waters are the bays adjoining and included within the Planning Area, including Hillsborough Bay and Tampa Bay.

The State of Florida water quality requirements are discussed in detail in Study Memorandum No. 5, Water Quality and Effluent Requirements, of the 201 Facility Plan. The results of these requirements are that wastewater discharged to surface streams in the Planning Area must undergo higher levels of wastewater treatment than secondary treatment. The degree of treatment is determined on the basis of wasteload allocation studies performed by the State.

In addition to discharge of effluent to the bay system or surface water streams, discharge to the Gulf of Mexico through a deep water outfall was also considered. Actual treatment requirements would be determined on the basis of a wasteload allocation study. However, the minimum treatment level required would be secondary treatment.

Treatment and Discharge To The Ground Water

The freshwater aquifers within the Planning Area are used extensively as a source of water supply. The Floridan Aquifer is especially used as a major water supply source, not only within the Planning Area, but throughout large portions of Florida.

Prior to September, 1970, six deep wells were constructed in Florida to dispose of wastes by injection. Five of these use a cavernous area in the base of the Floridan Aquifer known as the "Boulder Zone". The caverns are formed in dense dolostone that appears to restrict vertical movement of the injected wastewaters into the upper part of the Floridan Aquifer.

As discussed previously, the State of Florida requires that the minimum degree of treatment within Florida is secondary treatment. Final EPA regulations published in the Federal Register on June 24, 1980, require that underground waters with a level of total dissolved solids of 10,000 mg/l or less be protected. Migration of contaminants may not occur into an underground source of drinking water.

The main problems with deep well injection are that, until a well is actually drilled and tested, it is: (1) unknown whether or not a suitable injection zone exists; and, (2) unknown what will happen to the salt water that is displaced by the injected wastewater. Disposal of effluent by deep well injection is very costly.

Treatment and Land Application

Land application of treated wastewater provides for further removal or reduction of pollutants by physical and/or biological processes which occur in the soils. The successful operation of a land application system is dependent upon the characteristics such as soil structure and chemistry, topography, geology, hydrology, climate and vegetation. The land-treated wastewater is removed from the soil by evapotranspiration, returned to surface streams by runoff or percolates downward through the soil to the ground water.

There is potential for using land application techniques for wastewater treatment and disposal in the Central Hillsborough County - Tampa Planning Area. The most widely considered land application techniques - septic tank/soil absorption for individual homes or small communities; and spray irrigation for centralized sewerage systems serving larger populations are described briefly below. In addition, the applicability of each technique to meet wastewater treatment needs within the Planning Area is assessed.

Septic Tank/Soil Absorption System - Use of conventional individual on-lot septic tank/soil absorption systems is acceptable in areas with relatively low population densities and favorable soil, geologic, climatic and hydrologic conditions. Use of these systems is most often limited by one or a combination of the following conditions: (1) unsuitable soil permeability; (2) shallow depth to bedrock or hardpan; (3) shallow depth to seasonal high water table; or, (4) excessive slopes. If the limitations are not severe, use of modified septic tank/soil absorption systems may be acceptable. Site modifications may include grading and/or filling, while absorption system modifications may include constructing subsurface sand filters or elevated sand mounds. Septic tank/soil absorption systems may be used either with individual on-lot systems or a community-sized system may be implemented in small communities where population densities are too high for individual on-lot system but other conditions are favorable.

Soil associations within the Planning Area are generally suitable, unsuitable or severely limited for septic tank and drainfield wastewater disposal systems. Most of the unsuitable soil associations are due to shallow depths to the ground water table and are subject to frequent flooding.

Presently, portions of the Tampa Service Area and much of the County Service Area rely on septic systems for wastewater disposal. The unsuitability of some of the soils for septic systems is evidenced by the contamination of surface waters within the Planning Area which are partially attributed to septic system failures, especially during Florida's wet season.

Soils suitable for septic system use include the northeastern portion of the TSA and the central portions of the Thonotosassa and Brandon Study Areas. However, the portion of the TSA suitable for septic systems is located within the Hillsborough River basin upstream of the City of Tampa's water supply intake. Extensive use of septic systems in this area may result in contamination of the city's drinking water source.

The potential for using septic tank systems is probably greatest in the Thonotosassa Study Area. This area is currently sparsely populated and has yet to undergo heavy growth pressure.

In the Brandon Study Area, the area of suitable soils lies within karstic (sinkhole) terrain which is a recharge area for the Floridan Aquifer. Use of septic systems in this area would necessitate extensive monitoring to guard against elevated nitrate levels.

Spray Irrigation - This technique applies treated wastewater to a vegetated area where a portion of the water is treated as it percolates slowly through the soil to the ground water table and the remainder of the water is removed by evapotranspiration. This technique not only provides a high degree of treatment, but also provides for some economic return from crops which takeup nutrients in the wastewater.

Soil conditions within the Planning Area generally appear to be adequate to warrant investigating the possibility of using spray irrigation land application systems to meet the wastewater treatment needs of some of the study areas.

Much of the Planning Area has soils that are suitable for spray irrigation. However, use of this method requires large amounts of land area per "unit" of wastewater. In addition, the Florida Department of Environmental Regulation draft regulations require a minimum of secondary treatment, disinfection of the effluent with chlorine and storage of the effluent for at least three days prior to use. Due to the land requirements for application and storage, this method is not considered especially suited for disposal of large volumes of wastewater.

Wetland Application - The application of secondary effluent to existing freshwater and saltwater wetlands is being studied in a number of states. The ability of the natural systems to remove pollutants from treated effluent hold promise as an emerging technology for wastewater management. Management techniques for nutrient removal, loading rates, climatic constraints and suitable site characteristics are being studied at several locations. One disadvantage of wetland application is that overloading of the system by a malfunctioning treatment plant would pollute surface and ground waters. The recovery time of a damaged system is thought to be extensive.

Although specific treatment requirements have not been published by the State, criteria listed in the 201 Facility Plan Study Memorandum No. 5, Water Quality and Effluent Requirements, identify the following standards: secondary treatment; disinfection of effluent with chlorine; an application rate between 0.5 to 1.0 inches/acre/week; and a control structure for collection and monitoring the discharge from the swamp. This method is applicable for small wastewater flows due to the large area of wetland required for effluent treatment. Within the Planning Area, this method was considered to be applicable within the Deltona Study Area.

3. IDENTIFICATION OF WASTEWATER COLLECTION SYSTEM ALTERNATIVES

Typical wastewater collection systems are composed of conventional gravity sewers and force mains. Gravity sewers convey wastewater and solids from homes by gravity to central collection facilities for treatment or pumping to higher elevations. The size and slope of gravity sewers is based on carrying the design hydraulic load at velocities sufficient to prevent deposition of solids.

Within the Tampa Service Area, portions of the existing wastewater collection system requires substantial improvement to provide hydraulic relief for overloaded sewers and to correct structural deterioration of sewers that are no longer serviceable or where hydrogen sulfide attack has occurred. Projects now under construction or planned as part of Tampa's Fourth Wastewater Improvement Program will provide the hydraulic relief necessary in some existing sewers through flow diversion. Other existing sewers will require relief by replacement or parallel pipeline. Sewers with structural deficiencies will generally require replacement.

The hydraulic and structural deficiencies in the existing collection system have resulted in overflows into the Hillsborough River, streets, drainage canals and some bay waters. Additionally, disruptions in service and some local flooding has occurred. These deficiencies cause the periodic release of untreated wastewater from the collection system and, therefore, significantly compromise the effective operation of the system.

4. IDENTIFICATION OF GENERAL TREATMENT SYSTEM ALTERNATIVES

Physical chemical (P-C) methods were originally applied to municipal treatment plants as a tertiary treatment step to improve secondary biological effluent quality. The principal processes included chemical coagulation, filtration and activated carbon absorption for residual soluble organics removal. Because treatment costs are high per volume treated based on the current economy, no consideration is given to evaluating a purely physical-chemical treatment system.

Biological Wastewater Treatment Systems

Biological wastewater treatment systems used for secondary treatment of municipal wastewaters generally consist of solids removal by screening and primary sedimentation followed by a biological process which uses a mixed culture of micro-organisms to convert organic wastes to cellular material by biochemical oxidation. The excess cellular material is removed by sedimentation following the biological treatment process, generating a waste sludge which must be stabilized and disposed. Advanced levels of treatment (further BOD and nitrification reduction) may be accomplished by the addition of a second biological process unit.

5. NON-STRUCTURAL WASTEWATER MANAGEMENT SYSTEMS

Flow and Waste Reduction

The use of water conservation and flow reduction techniques is an important non-structural technique. Where a treatment plant is already overloaded, a reduction in wastewater flows could significantly improve wastewater treatment.

The reduction of flows could have several effects upon a community's wastewater system. First, treatment could be improved with reduced flows. Secondly, the community could possibly avoid the cost of constructing a new or expanded treatment plant with the reduction of flows into the existing plant or prolong the design life of plants presently being designed or constructed.

Domestic sewage production may be decreased by certain techniques for reducing water consumption which have evolved over the past several decades. Increasing water costs may be expected to induce such conservation of water by residential users; however, most of the reduction in consumption will be limited to residential uses such as lawn watering and car washing, which will not affect the overall sewage flows.

Concern about adequate water supply and water conservation has led to the development of numerous devices for reducing residential water usage. Included are such items as toilets which require considerably less water for flushing and shower heads which need less flow to produce the same washing and rinsing effects. Hillsborough County has adopted a water conservation ordinance which requires the development of a comprehensive water conservation policy and encourages the use of water saving fixtures. Also, plastic inserts have been installed in the toilet flush tanks of county customers to reduce the quantities of water used and wastewater generated by toilet flushing.

Reduced wastewater production by water conservation should continue to be encouraged. Reduction of the volume of wastewater, however, will have little effect on the quantity of waste constituents. Because the existing facilities are limited mainly by treatment capabilities, alternatives in addition to water conservation will be required to meet the future needs of the planning area.

Land Use and Development Controls

Land use controls which provide for some order to development may limit potential adverse impacts on water quality (and other environmental amenities) from uncontrolled growth. Limiting the density of septic system usage or preventing development within floodplain areas are specific applications of this type of control.

Land use controls are also important in areas of interceptor construction. Many times a cost-effective method of transporting wastewaters is abandoned for fear of uncontrolled growth near the interceptor line, especially if the interceptor is to pass through an environmentally sensitive area. This is not a very satisfactory approach to land use planning since the decision on interceptor location is actually determining the area of development. An effective land use program could end this type of indirect decision making.

In order to effectively plan and manage land use there are a variety of land management tools and techniques that are available to the various counties and municipalities in the study area. These techniques are:

- Comprehensive plans.
- Zoning ordinances.
- Subdivision and land development regulations.
- Easements.
- Fee Simple Acquisition of land.
- Staged growth policies.
- Conservation zoning district.
- Model zoning ordinances.

Land use control mechanisms may be of limited use in properly phasing development within the Planning Area since extensive development approvals have already been given at the local level.

PART C: EVALUATION OF MOST VIABLE ALTERNATIVES

Initial alternatives were developed by combining wastewater service configurations and disposal and treatment measures as discussed in Part B of this chapter. These initial alternatives are identified by service area and study area in Table II-1. Study areas were further divided into sewer districts. Development of the alternatives considered specific treatment to individual sewer districts within the CSA. These sewer districts are shown on Figure II-1. Detailed cost estimates were prepared to determine the total present worth and equivalent cost of each of these alternatives. The basic assumptions and cost data used in making these cost estimates are detailed in the 201 Facility Plan, Study Memorandum No. 7, Cost Estimating Bases.

Alternatives were considered to be cost-effective if the cost of the alternative was within ten percent of the lowest cost alternative. The alternatives that were considered cost-effective or warranted further evaluation are identified with an asterisk (*) on Table II-1. These alternatives are discussed further in the following sections.

In addition to the alternatives developed as discussed above, a requirement of the EIS process is that a no-action alternative will be considered along with other wastewater facilities alternatives. The no-action alternative implies that no federal funding would be available for wastewater facilities in the Central Hillsborough County - Tampa 201 Facilities Planning Area. Under this alternative, improvement and/or expansion of the wastewater facilities would be required but there would be no federal funds provided for design and construction of the facilities.

A no-action alternative does not imply no-growth. Growth would continue but any wastewater functions would be supported by private capital, or local and state funding. However, a no-action alternative could possibly alter growth throughout the area. Under the concept of no action there would be complete reliance upon state, local or private funds to finance any wastewater management facilities. However, without the support of federal funds, the level of additional wastewater facilities would be significantly different than under any of the other wastewater management alternatives.

TABLE II-1

CENTRAL HILLSBOROUGH COUNTY - TAMPA 201 PLANNING AREA ALTERNATIVES DEVELOPMENT

Alternative Designation	Million Gallons Per Day Amount To Tampa	 Amount To Study Area	Treatment In Study Area	Disposal Method In Study Area
		DELTONA STUDY AREA		
*D1	--	1.39	Secondary	Wetlands Disposal
D2	--	1.39	Secondary & Filtration	Deep Well Injection
*D3	1.39	--	--	--
		THONOTOSASSA STUDY AREA		
*T1	--	0.55	Secondary	Spray Irrigation
T2	--	0.55	Secondary & Filtration	Deep Well Injection
*T3	0.55	--	--	--
		BRANDON STUDY AREA		
*B1	--	9.73	Secondary & Nitrification	To Alafia River
B2	--	9.73	Advanced Wastewater Treatment	To Alafia River
*B3	--	9.73	Secondary	Spray Irrigation
B4	--	9.73	Secondary & Filtration	Deep Well Injection
B5	5.60	4.13	Secondary & Nitrification	To Alafia River
B6	5.60	4.13	Advanced Wastewater Treatment	To Alafia River
B7	5.60	4.13	Secondary	Spray Irrigation
B8	5.60	4.13	Secondary & Filtration	Deep Well Injection
B9	7.91	1.82	Secondary & Nitrification	To Alafia River
B10	7.91	1.82	Advanced Wastewater Treatment	To Alafia River
B11	7.91	1.82	Secondary	Spray Irrigation
B12	7.91	1.82	Secondary & Filtration	Deep Well Injection
*B13	9.73	--	--	--
		RIVERVIEW-GIBSONTON STUDY AREA		
*RG1	--	5.85	Secondary & Nitrification	To Alafia River
RG2	-	5.85	Advanced Wastewater Treatment	To Alafia River
RG3	--	5.85	Advanced Wastewater Treatment	To Hillsborough Bay
*RG4	--	5.85	Secondary	Spray Irrigation
RG5	--	5.85	Secondary & Filtration	Deep Well Injection
*RG6	5.85	--	--	--
*RG7	--	--	5.85 MGD To South County 201 Planning Area	--
RG8	2.29	3.56	Secondary & Nitrification	To Alafia River
RG9	2.29	3.56	Advanced Wastewater Treatment	To Alafia River
RG10	2.29	3.56	Advanced Wastewater Treatment	To Hillsborough Bay
RG11	2.29	3.56	Secondary	Spray Irrigation
RG12	2.29	3.56	Secondary & Filtration	Deep Well Injection
RG13	2.29	--	3.56 MGD To South County 201 Planning Area	--

*Selected for more detailed analysis.

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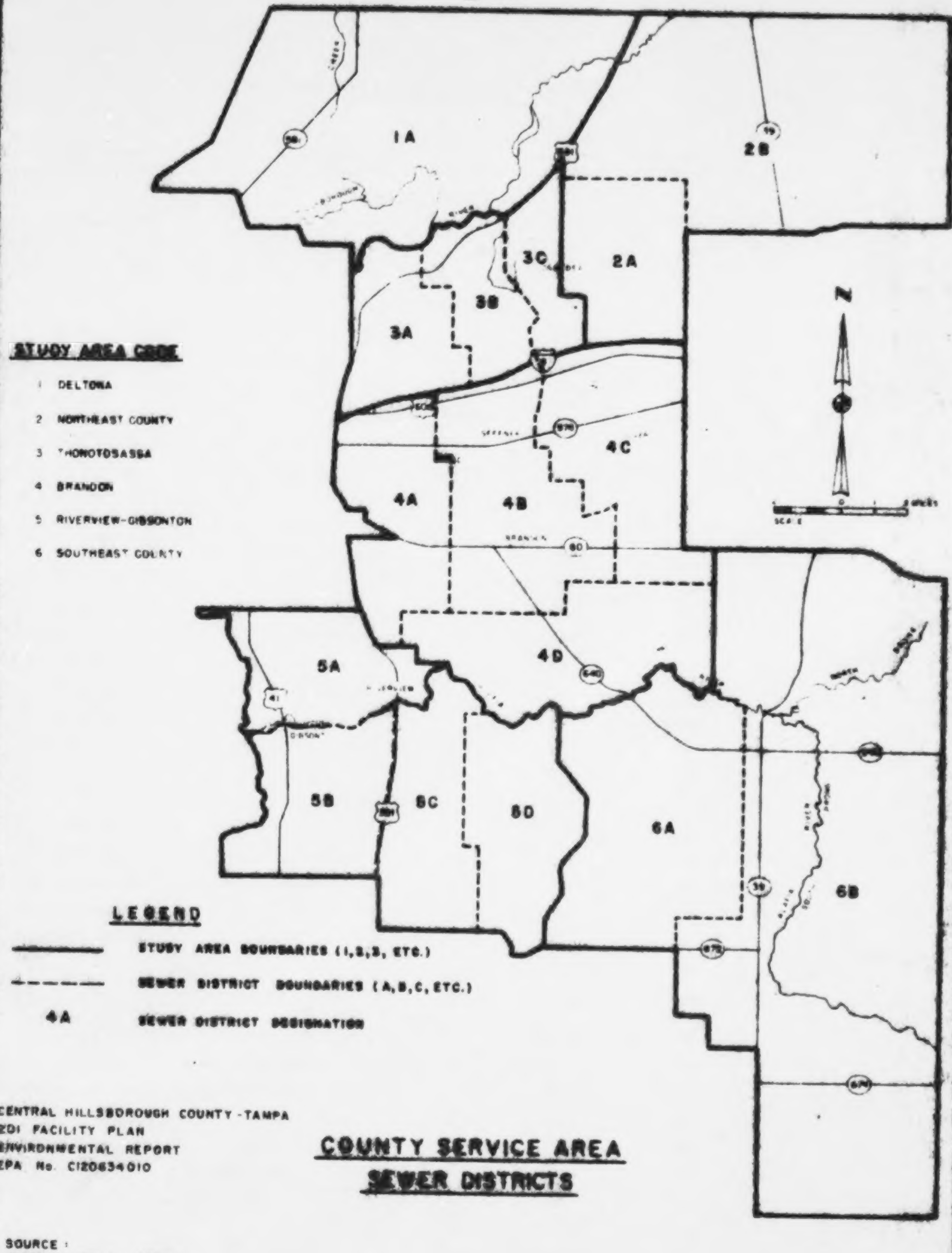
STUDY AREA CODE
1 DELTONA
2 NORTHEAST COUNTY
3 THONOTOSASSA
4 BRANDON
5 RIVERVIEW-GIBSONTON
6 SOUTHEAST COUNTY
LEGEND
STUDY AREA BOUNDARIES (1,2,3, ETC.)
SEWER DISTRICT BOUNDARIES (A,B,C, ETC.)
4A SEWER DISTRICT DESIGNATION
1A
2B
2A
3A
3B
3C
4A
4B
4C
4D
5A
5B
5C
5D
6A
6B
301
581
19
4
574
60
640
41
39
672
674
N
SCALE
MILES

CENTRAL HILLSBOROUGH COUNTY-TAMPA
201 FACILITY PLAN
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EPA No. C120634010

COUNTY SERVICE AREA
SEWER DISTRICTS

SOURCE:
SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

FIGURE II-1

0765601026 (7/81)

1. TAMPA SERVICE AREA (TSA)

Alternatives for wastewater management within the TSA are divided into two groups: treatment and disposal alternatives; and, collection and transmission alternatives.

Treatment and Disposal

Due to the existance of and present capacity expansion at the City of Tampa's Hookers Point treatment facility, no alternate treatment facility locations were considered. All alternative comparisons at the Hookers Point facility were based on wastewater treatment capacity equal to the estimated total wastewater quantities (113.96 mgd) from the Planning Area. Treatment alternatives were based on the selected disposal alternatives. Two disposal alternatives, the Gulf of Mexico outfall and spray irrigation, require secondary treatment of wastewater. Surface water discharge to Hillsborough Bay may require the use of advanced wastewater treatment (AWT) depending on the results of a wasteload allocation as required by the Wilson-Grizzle Act. Presently the existing plant facilities are limited to the discharge of effluent with phosphorous concentrations less than 7.5 mg/l and nitrogen concentrations less than 3 mg/l. A wasteload allocation study is presently being performed by the Florida Department of Environmental Regulation to determine whether more stringent levels are required. However, the AWT alternative studies were developed based on the consideration that more stringent AWT limits would be, in general, a common element to all AWT projects.

Capacity of the existing facilities at the Hookers Point Plant related to the potential alternatives for effluent disposal are summarized as follows:

1. Secondary Effluent - The existing activated sludge facilities have capacity to provide secondary treatment for the estimated total wastewater quantities (113.96 mgd) from the Planning Area. Additional facilities will be required for the preliminary treatment, disinfection, by-product solids treatment and effluent disposal.

2. AWT Effluent - The existing activated sludge facilities have capacity to provide either carbonaceous treatment or nitrification for the estimated total wastewater quantities (113.96 mgd) from the Planning Area. The existing facilities may also be operated to provide 2-step nitrification for 60 mgd. Additional facilities will be required for preliminary treatment, denitrification, disinfection and by-product solids treatment and for other unit processes depending on the manner of employment of the existing works.

The alternatives developed and evaluated for the expansion of the existing facilities to meet AWT requirements included series and several parallel arrangements and process variations to denitrify biologically without the use of methanol. Details of the various process alternatives considered are contained in the 201 Facilities Plan, Study Memorandum No. 8, Alternative Project Studies.

Three alternatives pertaining to treatment and disposal were further evaluated. These alternatives were:

- Secondary treatment with spray irrigation (S-1).

- Secondary treatment with Gulf outfall (S-2).

- AWT with discharge to Hillsborough Bay (IDN-1).

Both discharge alternatives resulting in secondary treatment require the purchase of considerable amounts of land and/or right-of-ways. For Alternative S-1, disposal of secondary treated effluent by spray irrigation, eight spray irrigation sites were estimated to be required (Figure II-2). Each spray irrigation site consists of spray irrigation storage and distribution facilities serving approximately eight 232-acre spray areas. In addition, rights-of-way are required for an 84-inch diameter transmission main.

For the Gulf outfall, rights-of-way for an 84-inch diameter transmission main are required to reach the Gulf. Preliminary locations for the transmission line and outfall are shown in Figure II-3.

Alternate IDN-1 (AWT) would continue the existing practice of discharging effluent to Hillsborough Bay. While actual effluent characteristics will be based on the outcome of an ongoing wasteload allocation study, the principal features of this alternative are shown on Figure II-4. These features include: no additional primary sedimentation tanks; use of the existing HPOAS facilities for 2-step nitrification; the addition of new parallel HPOAS facilities for nitrification/dentrification without the use of methanol; and, the addition of new deep bed filters for residual suspended solids, BOD_5 removal and for residual dentrification with methanol as required.

The Equivalent Annual Cost (EAC) of these three alternatives is:

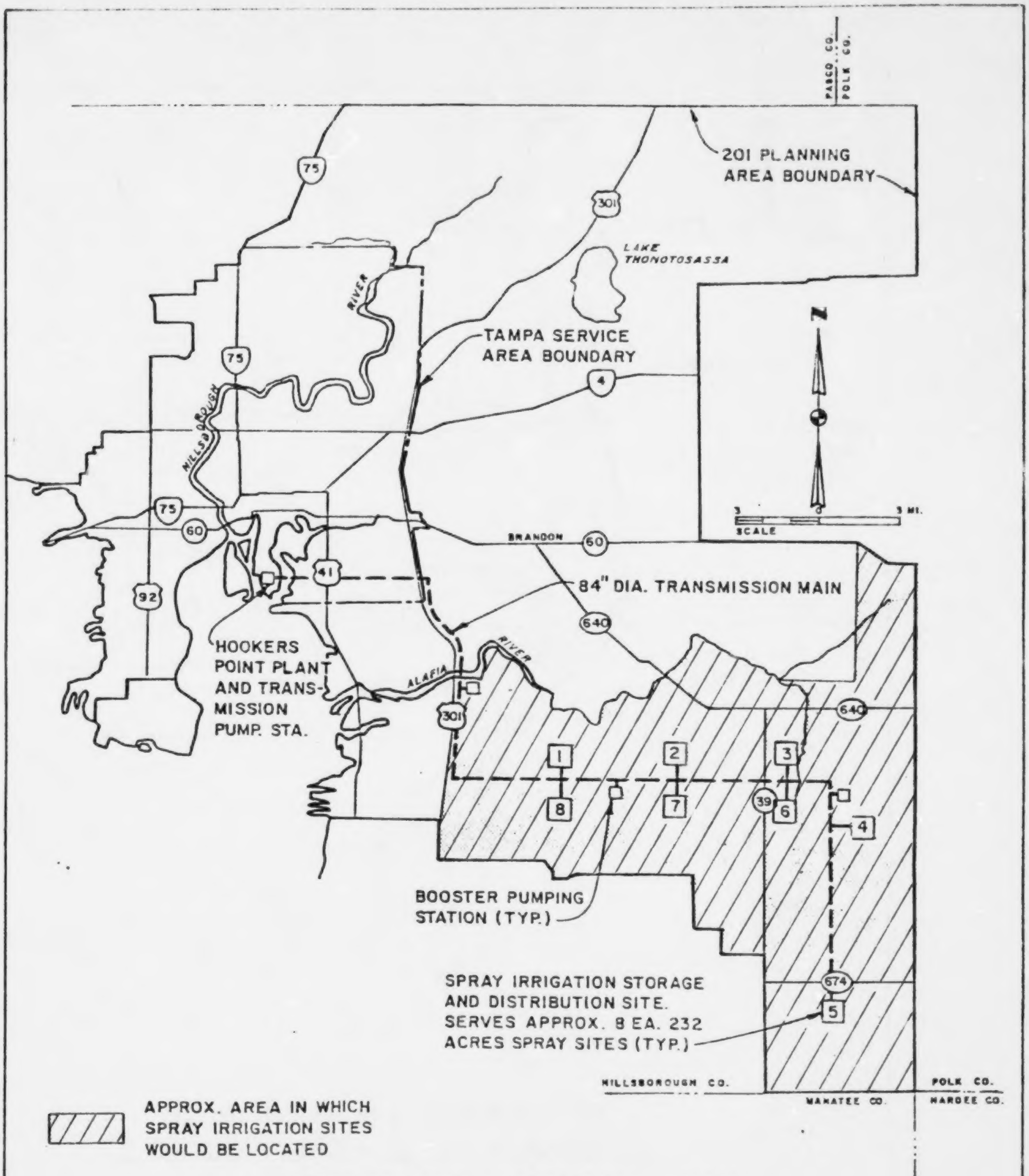
Alternative	EAC
S-1 Secondary Treatment - Spray Irrigation	$24,851,000
S-2 Secondary Treatment - Gulf Outfall	$22,623,000
IDN-1 AWT - Discharge To Hillsborough Bay	$15,792,000

A "no action" alternative is not appropriate for the collection, treatment and disposal of wastewater within the TSA. The existing collection system requires repair and hydraulic relief to prevent overflows of untreated wastewater. Most areas not currently sewered are unsuitable for septic tank disposal of wastewater resulting in potential contamination of local ground and surface waters. In addition, a considerable number of interim package plants have been constructed which use percolation ponds for effluent disposal. These ponds represent potential sources of ground and surface water contamination. For these reasons, combined with the existance of a regional system, the "no action" alternative is considered inappropriate and the alternative assessment included only continued regionalization of the wastewater system.

Collection and Transmission

The results of the study of the adequacy of the hydraulic capacity of the existing intercepting and secondary intercepting systems are described in the 201 Facilities Plan, Study Memorandum No. 6, Existing Facilities - Tampa Service Area - Wastewater Collection System. These results indicate that portions of the existing system are presently overloaded due to structural deterioration or insufficient hydraulic capacity. As a result, overflows of untreated wastewater into the Hillsborough River, streets, drainage canals and some bay waters and, service disruptions have occurred.

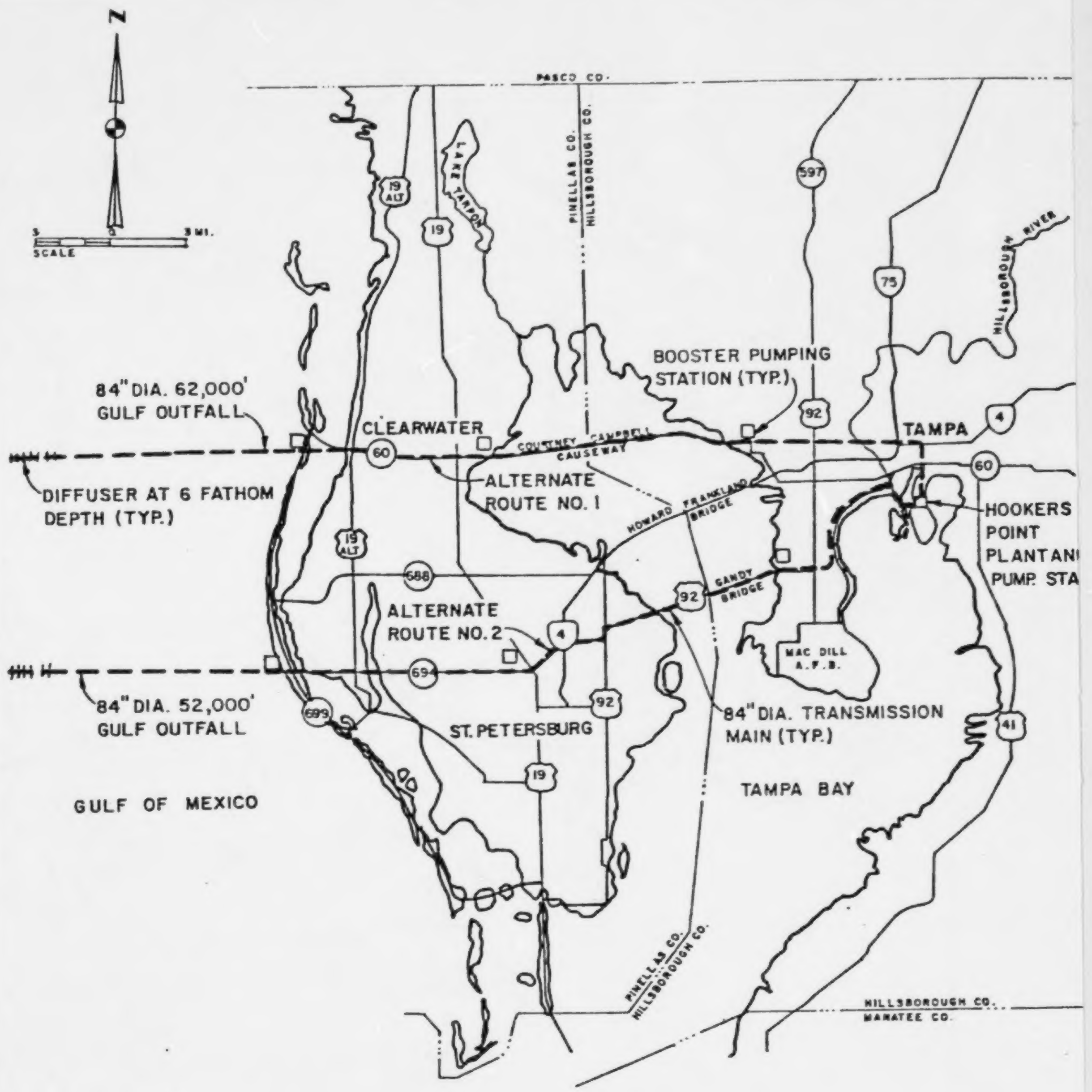
In areas currently served by septic tank systems, malfunctioning of these systems have occurred during periods of high rainfall. This has resulted in inoperative systems and contributes to contamination of local surface waters.


PASCO CO.
POLK CO.
201 PLANNING AREA BOUNDARY
75
301
LAKE THONOTOSASSA
RIVER
HILLSBOROUGH
TAMPA SERVICE AREA BOUNDARY
4
N
3 0 3 MI.
SCALE
75
60
BRANDON
60
41
84" DIA. TRANSMISSION MAIN
92
640
HOOKERS POINT PLANT AND TRANSMISSION PUMP. STA.
ALAFIA RIVER
301
640
1
2
3
8
7
39
6
4
BOOSTER PUMPING STATION (TYP.)
SPRAY IRRIGATION STORAGE AND DISTRIBUTION SITE. SERVES APPROX. 8 EA. 232 ACRES SPRAY SITES (TYP.)
674
5
HILLSBOROUGH CO.
MANATEE CO.
POLK CO.
HARDEE CO.
APPROX. AREA IN WHICH SPRAY IRRIGATION SITES WOULD BE LOCATED

PRELIMINARY LOCATION PLAN
ALTERNATE S-1, SPRAY IRRIGATION
SECONDARY TREATMENT

SOURCE :
SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

CENTRAL HILLSBOROUGH COUNTY - TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010 **DAMES & MOORE**
FIGURE II-2


N
3
0
3 MI.
SCALE
PASCO CO.
PINELLAS CO.
HILLSBOROUGH CO.
LAKE TARPON
19 ALT
19
597
75
HILLSBOROUGH RIVER
BOOSTER PUMPING STATION (TYP.)
84" DIA. 62,000' GULF OUTFALL
CLEARWATER
92
TAMPA
4
60
COURTNEY CAMPBELL CAUSEWAY
DIFFUSER AT 6 FATHOM DEPTH (TYP.)
ALTERNATE ROUTE NO. 1
HOWARD FRANKLAND BRIDGE
HOOKERS POINT PLANTAN
PUMP. STA
688
GANDY BRIDGE
ALTERNATE ROUTE NO. 2
694
MAC DILL A.F.B.
84" DIA. 52,000' GULF OUTFALL
699
ST. PETERSBURG
84" DIA. TRANSMISSION MAIN (TYP.)
41
GULF OF MEXICO
TAMPA BAY
PINELLAS CO.
HILLSBOROUGH CO.
HILLSBOROUGH CO.
MANATEE CO.

PRELIMINARY LOCATION PLAN
ALTERNATE S-2, GULF OUTFALL
SECONDARY TREATMENT

SOURCE :
SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

CENTRAL HILLSBOROUGH COUNTY – TAMPA
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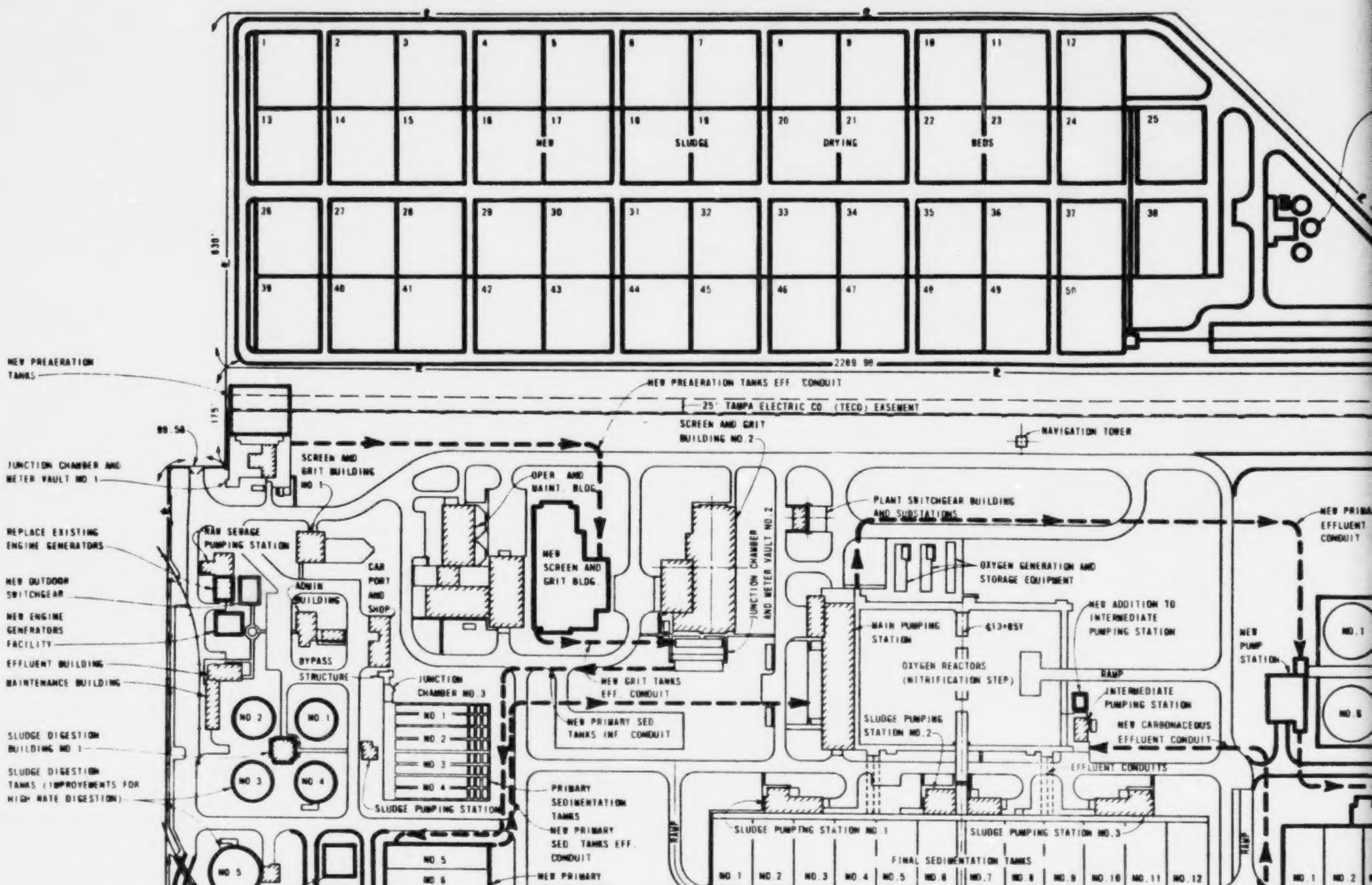
FIGURE II-3


NEW SLUDGE DRYING BEDS
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
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26
27
28
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30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
630'
2289.98
175'
1703.11
2850.44'
NEW PREAERATION TANKS
NEW PREAERATION TANKS EFF. CONDUIT
25' TAMPA ELECTRIC CO. (TECO) EASEMENT
NO. 58
SCREEN AND GRIT BUILDING NO. 1
SCREEN AND GRIT BUILDING NO. 2
NAVIGATION TOWER
JUNCTION CHAMBER AND METER VAULT NO. 1
OPER. AND MAINT. BLDG.
NEW SCREEN AND GRIT BLDG.
JUNCTION CHAMBER AND METER VAULT NO. 2
PLANT SWITCHGEAR BUILDING AND SUBSTATIONS
NEW PRIMARY EFFLUENT CONDUIT
REPLACE EXISTING ENGINE GENERATORS
RAW SEWAGE PUMPING STATION
OXYGEN GENERATION AND STORAGE EQUIPMENT
NEW OUTDOOR SWITCHGEAR
ADMIN BUILDING
CAR PORT AND SHOP
MAIN PUMPING STATION
€13+85Y
NEW ADDITION TO INTERMEDIATE PUMPING STATION
NEW ENGINE GENERATORS FACILITY
OXYGEN REACTORS (NITRIFICATION STEP)
NEW PUMP STATION
EFFLUENT BUILDING
BYPASS STRUCTURE
JUNCTION CHAMBER NO. 3
RAMP
MAINTENANCE BUILDING
NEW GRIT TANKS EFF. CONDUIT
INTERMEDIATE PUMPING STATION
NEW PRIMARY SED TANKS INF. CONDUIT
NEW CARBONACEOUS EFFLUENT CONDUIT
SLUDGE PUMPING STATION NO. 2
SLUDGE DIGESTION BUILDING NO. 1
SLUDGE DIGESTION TANKS (IMPROVEMENTS FOR HIGH RATE DIGESTION)
NO. 1
NO. 2
NO. 3
NO. 4
NO. 5
SLUDGE PUMPING STATION
EFFLUENT CONDUITS
PRIMARY SEDIMENTATION TANKS
NEW PRIMARY SED. TANKS EFF. CONDUIT
SLUDGE PUMPING STATION NO. 1
SLUDGE PUMPING STATION NO. 3
FINAL SEDIMENTATION TANKS
NO. 1
NO. 2
NO. 3
NO. 4
NO. 5
NO. 6
NO. 7
NO. 8
NO. 9
NO. 10
NO. 11
NO. 12
NEW VEHICLE FUELING FACILITIES (FUEL PRODUCED FROM DIGESTER GAS)
NEW PRIMARY SEDIMENTATION TANKS
NO. 5
NO. 6
NO. 7
NO. 8
NO. 9
NO. 10
SECONDARY TREATMENT CONTROL CONDUIT
ACCESS BUILDING
PIPE TUNNEL
METHANOL STORAGE TANK
BREWERY WASTE STORAGE TANK
LIQUID ALUM STORAGE TANK (TYP.)
DIGESTED SLUDGE STORAGE TANKS
NO. 1
NO. 2
NO SIDING €0+75X
LIQUID ALUM UNLOADING STA (TYP.)
CHEM. HANDLING EQUIP. PLATFORM
NIT. EFF. CONDUIT
NEW NIT. EFF. CONDUIT
BACKFLOW STRUCTURE
TRUCK UNLOADING STATION
NEW ANAEROBIC DIGESTION FACILITIES (FOR BIO-STEP SLUDGE)
NO. 5
NO. 6
NO. 3
NO. 4
NO. 1
NO. 2
SLUDGE DRYING BEDS
AEROBIC DIGESTION TANKS
SLUDGE HOLDING
NO. 1
NO. 2
NO. 3
NO. 4
METHANOL UNLOADING STA (TYP.)
FILTER BUILDING
3 NEW BELT FILTERS (INTERIM LOCATION)
NO. 1
NO. 2
NO. 9
NO. 10
NEW POST AERATION-CHLORINATION TANKS
CHLORINE UNLOADING STATION
POST AERATION-CHLORINATION TANKS
DENITRIFICATION FILTERS
NEW FINAL EFFLUENT CONDUIT
SLUDGE TREATMENT BLDG AND SLUDGE THICKENING TANKS
AEROBIC DIGESTION TANK TO BE CONVERTED TO DAF THICKENING
AEROBIC DIGESTION TANK TO BE CONVERTED TO BELT FILTER FACILITY
JUNCTION CHAMBER NO. 4
OVERFLOW STRUCTURE
GRAVITY THICKENING TANKS TO BE MODIFIED FOR PRIMARY SLUDGE SERVICE
AEROBIC DIGESTION TANK TO BE CONVERTED TO SERVICE FACILITY
NEW DENITRIFICATION FILTERS
NO. 17
NO. 18
NO. 25
NO. 26
GENERAL AMERICAN TRANSPORTATION CORP
UNION OIL CO

CENTRAL HILLSBOROUGH COUNTY-TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

REFERENCE:
SMITH AND GILLESPIE
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ENGINEERS

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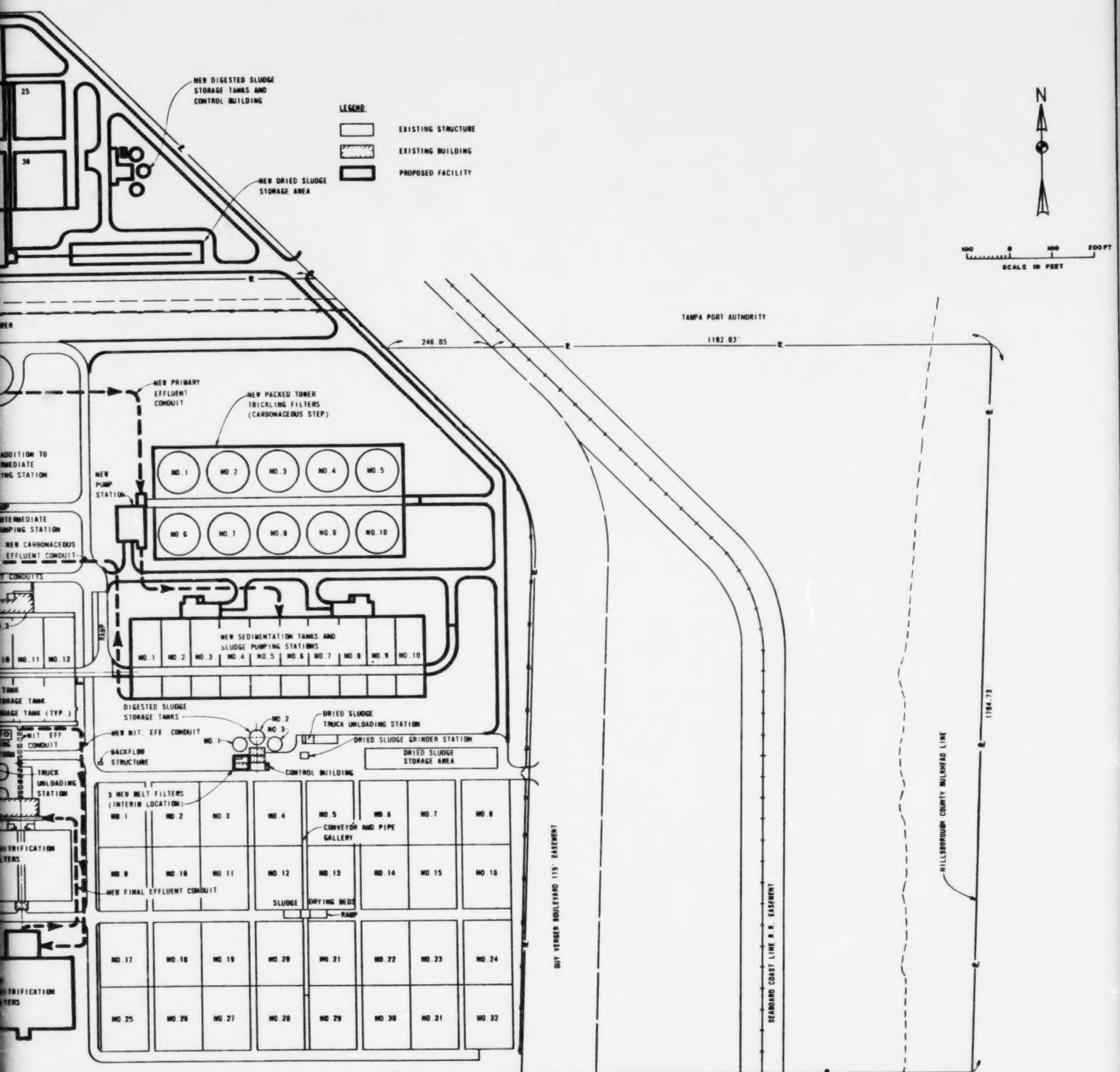
NEW DIGESTED SLUDGE STORAGE TANKS AND CONTROL BUILDING
25
30
LEGEND
EXISTING STRUCTURE
EXISTING BUILDING
PROPOSED FACILITY
NEW DRIED SLUDGE STORAGE AREA
N
100 0 100 200 FT
SCALE IN FEET
TAMPA PORT AUTHORITY
246.05
1192.03'
NEW PRIMARY EFFLUENT CONDUIT
NEW PACKED TOWER TRICKLING FILTERS (CARBONACEOUS STEP)
NO.1
NO.2
NO.3
NO.4
NO.5
NO.6
NO.7
NO.8
NO.9
NO.10
NEW PUMP STATION
INTERMEDIATE PUMPING STATION
NEW CARBONACEOUS EFFLUENT CONDUIT
NEW SEDIMENTATION TANKS AND SLUDGE PUMPING STATIONS
RAMP
DIGESTED SLUDGE STORAGE TANKS
DRIED SLUDGE TRUCK UNLOADING STATION
DRIED SLUDGE GRINDER STATION
NEW NIT. EFF. CONDUIT
BACKFLOW STRUCTURE
DRIED SLUDGE STORAGE AREA
CONTROL BUILDING
TRUCK UNLOADING STATION
3 NEW BELT FILTERS (INTERIM LOCATION)
CONVEYOR AND PIPE GALLERY
NEW FINAL EFFLUENT CONDUIT
SLUDGE DRYING BEDS
RAMP
NO.11
NO.12
NO.13
NO.14
NO.15
NO.16
NO.17
NO.18
NO.19
NO.20
NO.21
NO.22
NO.23
NO.24
NO.25
NO.26
NO.27
NO.28
NO.29
NO.30
NO.31
NO.32
GUY VERGER BOULEVARD 115' EASEMENT
SEABOARD COAST LINE R.R. EASEMENT
HILLSBOROUGH COUNTY BULKHEAD LINE
1784.73
175.17'
899.71'
APPROXIMATE CHANNEL SHORELINE

HOOKERS POINT AWT PLANT
PROPOSED PLANT EXPANSION

DAMES & MOORE

FIGURE II-4

New collection and transmission facilities are needed to: provide relief to existing overloaded facilities; provide service to developed and developing neighborhoods presently serviced by individual systems; and, provide for the intercepting and transmission of the anticipated large quantities of wastewater generated in those portions of the Tampa Service Area which will be sewered after the year 1980.

Investigations of alternative intercepting and secondary intercepting projects for the Tampa Service Area to meet the aforementioned wastewater collection, transmission and relief needs were commenced in 1970 under Tampa's ongoing Fourth Wastewater Improvement Program. Cost-effective projects were selected after thorough consideration of required hydraulic capacity, route selection, construction costs and other criteria. Under the Central Hillsborough County - Tampa 201 Facility Plan, these intercepting and secondary intercepting projects were completely reevaluated with respect to the 201 Facility Planning criteria, as discussed in Study Memorandum No. 8, Alternative Project Studies.

Due to the extreme urgency of constructing these new facilities, three Advance Reports ("Early-Outputs") of the Central Hillsborough County - Tampa 201 Facility Plan have been completed for the following systems:

1. Central Intercepting System (February, 1977).
2. Interbay Intercepting System (May, 1977).
3. Northwest Secondary Intercepting System (April, 1978).

The Advance Reports for the Central and Interbay Intercepting Systems have been approved by the Florida Department of Environmental Regulation and the Federal Environmental Protection Agency. Federally financed grants have been made available for the construction of both these systems. Construction of the 13½ mile long Central Intercepting System is nearly complete and construction on the 13½ mile long Interbay Intercepting System commenced recently. The Advance Report for the Northwest Secondary Intercepting System was recently approved.

Studies made in accordance with 201 Facility Plans for all proposed intercepting and secondary intercepting system facilities (not including the Central and Interbay Intercepting Systems), neighborhood collection systems and improvements to the existing system are described in the 201 Facilities Plan, Study Memorandum No. 8, Alternative Project Studies. With the exception of the Northeast, Eastern and Southeast Intercepting Systems, all proposed facilities will serve only the Tampa Service Area. A number of alternative projects were developed for the transmission of wastewater generated in the County Service Area into proposed Tampa Northeast, Eastern and Southeast Intercepting Systems. Hydraulic capacity studies and corresponding construction cost estimates have been developed for the Northeast, Eastern and Southeast Intercepting Systems facilities with and without County wastewater flows.

As a result of these studies, two viable alternatives were developed for further evaluation. One alternative is to provide service to all of the areas shown in Figure II-5. This alternative results in the collection of 96 mgd of wastewater flows by the year 2000.

The second alternative consists of providing service to all the areas shown in Figure II-5 except the second phase of the Northeast Interceptor. Sewer lines will be sized based on the same criteria as the other alternative.

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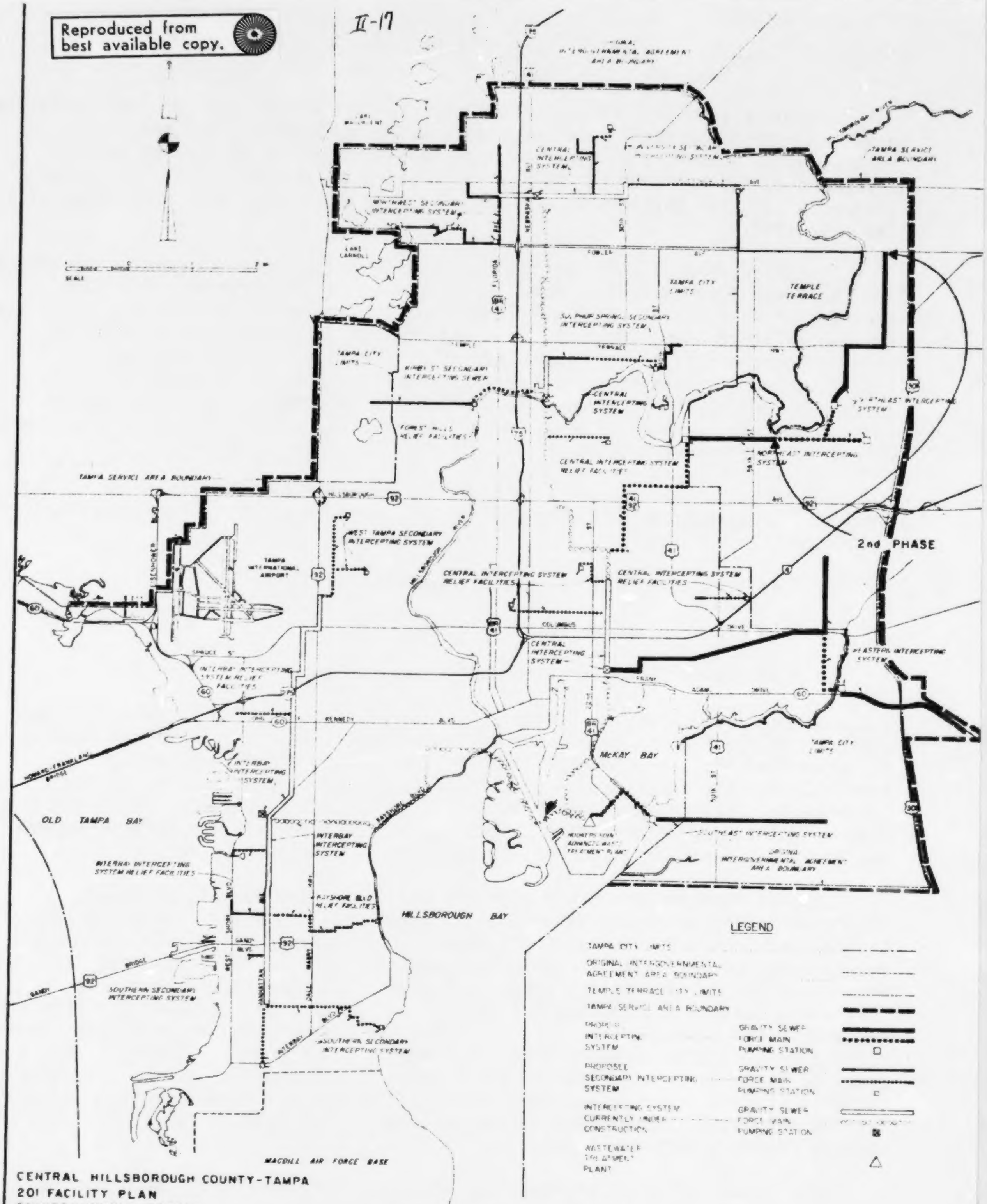

ORIGINAL INTERGOVERNMENTAL AGREEMENT AREA BOUNDARY
TAMPA SERVICE AREA BOUNDARY
CENTRAL INTERCEPTING SYSTEM
NORTHWEST SECONDARY INTERCEPTING SYSTEM
LAKE CARROLL
TAMPA CITY LIMITS
TEMPLE TERRACE
SULPHUR SPRINGS SECONDARY INTERCEPTING SYSTEM
KIRBY ST. SECONDARY INTERCEPTING SEWER
FOREST HILLS RELIEF FACILITIES
CENTRAL INTERCEPTING SYSTEM RELIEF FACILITIES
NORTHEAST INTERCEPTING SYSTEM
2nd PHASE
WEST TAMPA SECONDARY INTERCEPTING SYSTEM
TAMPA INTERNATIONAL AIRPORT
EASTERN INTERCEPTING SYSTEM
INTERBAY INTERCEPTING SYSTEM RELIEF FACILITIES
KENNEDY BLVD
McKAY BAY
OLD TAMPA BAY
INTERBAY INTERCEPTING SYSTEM
HOOKERS POINT ADVANCED WASTE TREATMENT PLANT
SOUTHEAST INTERCEPTING SYSTEM
BAYSHORE BLVD RELIEF FACILITIES
HILLSBOROUGH BAY
SOUTHERN SECONDARY INTERCEPTING SYSTEM
MACDILL AIR FORCE BASE
SCALE
LEGEND
TAMPA CITY LIMITS
ORIGINAL INTERGOVERNMENTAL AGREEMENT AREA BOUNDARY
TEMPLE TERRACE CITY LIMITS
TAMPA SERVICE AREA BOUNDARY
PROPOSED INTERCEPTING SYSTEM
GRAVITY SEWER
FORCE MAIN
PUMPING STATION
PROPOSED SECONDARY INTERCEPTING SYSTEM
GRAVITY SEWER
FORCE MAIN
PUMPING STATION
INTERCEPTING SYSTEM CURRENTLY UNDER CONSTRUCTION
GRAVITY SEWER
FORCE MAIN
PUMPING STATION
WASTEWATER TREATMENT PLANT

CENTRAL HILLSBOROUGH COUNTY-TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No C120634010

TAMPA SERVICE AREA
PROPOSED EXPANSION OF INTERCEPTING AND SECONDARY INTERCEPTING SYSTEMS

SOURCE:

SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

DAMES & MOORE

FIGURE II-5

A "No Action" alternative was also evaluated for the collection and transmission of wastewater within the TSA, but was considered inappropriate as discussed in the previous section.

2. COUNTY SERVICE AREA (CSA)

Alternatives considered cost-effective and receiving further evaluation (Table II-1) are identified and discussed by County Study Areas in the following.

Deltona Study Area

Although the Deltona Study Area is sparsely populated at the present time, a large residential development in the area has been planned by the Deltona Corporation. Evaluation of soil characteristics and ground water conditions indicate that the area is unsuitable for the use of septic tanks. Therefore, if development occurs in the study area, facilities for collection, treatment and disposal will be required. There are no surface waters suitable for discharge of treated wastewater in the study area. Also, the area is unsuitable for spray irrigation as a method of wastewater disposal.

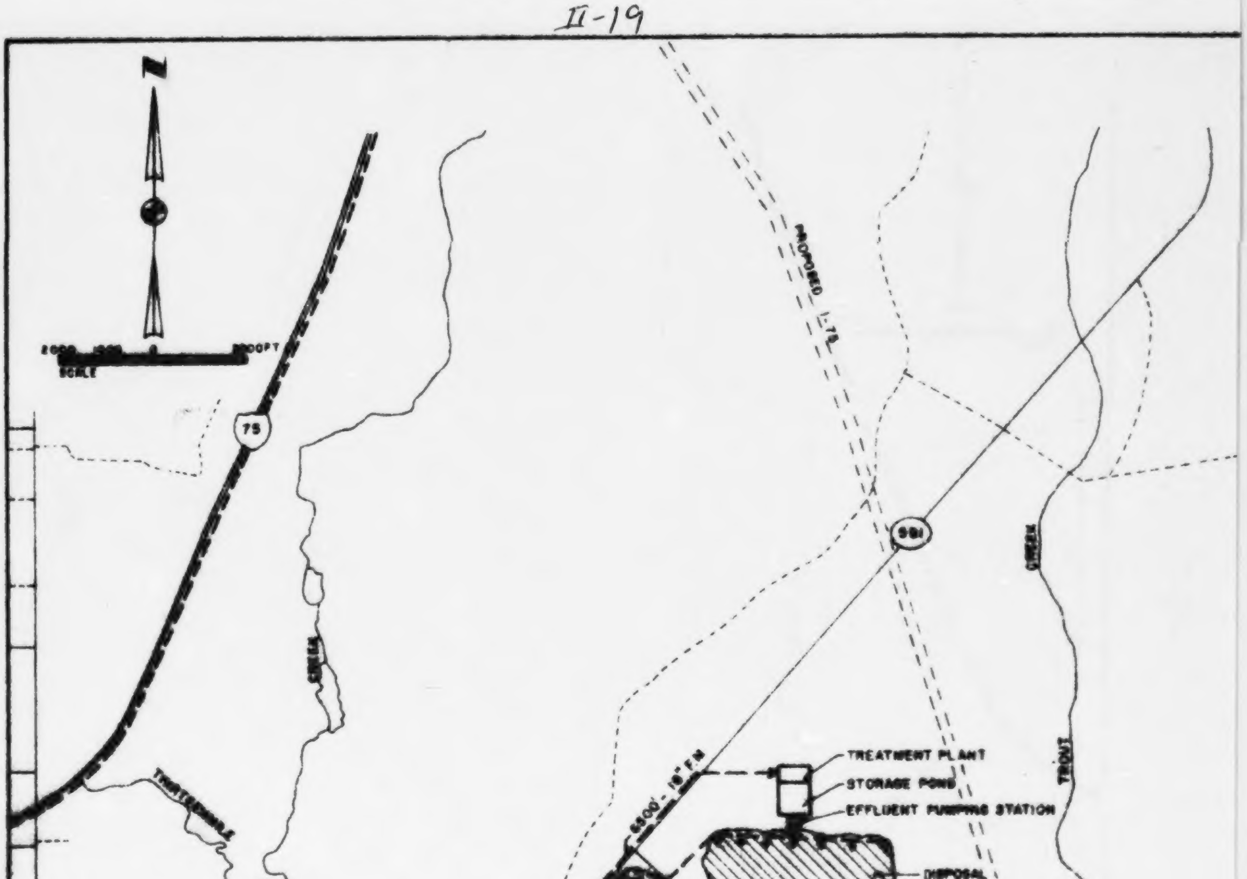
In addition to the "No Action" alternative, two wastewater collection, treatment and disposal alternatives were considered for further evaluation: alternative D1, construction of a facility within the study area to provide secondary treatment of the wastewater with wetlands disposal of effluent; and, alternative D3, collection of wastewater with transmission to the TSA for treatment at the City of Tampa's Hookers Point facility. These alternatives are shown in Figures II-6 and II-7, respectively. Both of these alternatives are based on the collection and treatment of 1.30 mgd of wastewater. The EAC of alternative D1 is $741,000 and $675,000 for alternative D3.

Under the "No Action" alternative, it is envisioned that the developer, Deltona Corporation, would probably fund all of the construction costs of a pump station and interceptor to convey wastewater to the TSA for treatment and disposal. In addition, the developer would be required to pay the incremental cost of expanding the Hookers Point treatment capacity for 1.3 mgd wastewater flow.

Thonotosassa Study Area

Existing developments in the Thonotosassa Study Area are primarily residential and are located along Highway 301 west of Lake Thonotosassa and west of State Road 579 north of Interstate 4. Urban transition development of the remainder of Sewer District 3A and part of Sewer District 3B is projected. Rural development is projected for the western portion of the study area. The 201 Facilities Plan concluded that facilities for wastewater collection, treatment and disposal will be required for Sewer District 3A. There are no surface waters suitable for discharge of treated effluent in the study area. Soil and ground water conditions in portions of the study area are suitable for spray irrigation and septic tank usage.

In addition to the "No Action" alternative, two additional alternatives for the collection, treatment and disposal of wastewater in the study area were further evaluated: construction of a facility within the study area to provide secondary treatment of the wastewater and disposal of the effluent by spray irrigation (alternative T1); and, collection of wastewater with transmission to the TSA for treatment at Tampa's Hookers Point facility (alternative T3). These alternatives are shown in Figures II-8 and II-9, respectively.


N
2000 1000 0 2000FT
SCALE
75
PROPOSED I-75
991
CREEK
TROUT
CREEK
RUN
CYPRESS
TREATMENT PLANT
STORAGE POND
EFFLUENT PUMPING STATION
6500'- 18" F.M.
DISPOSAL AREA NO 1
MONITOR STATION
MASTER LIFT STATION
DISPOSAL AREA NO 2
MONITOR STATION
DELTONA
DISPOSAL AREA NO 3
MONITOR STATION
HILLSBOROUGH RIVER
STUDY AREA
BOUNDARY
30TH STREET
FLETCHER AVE.

COUNTY ALTERNATIVE D1

SECONDARY TREATMENT/WETLANDS DISPOSAL

SOURCE :
SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

CENTRAL HILLSBOROUGH COUNTY - TAMPA
201 FACILITY PLAN
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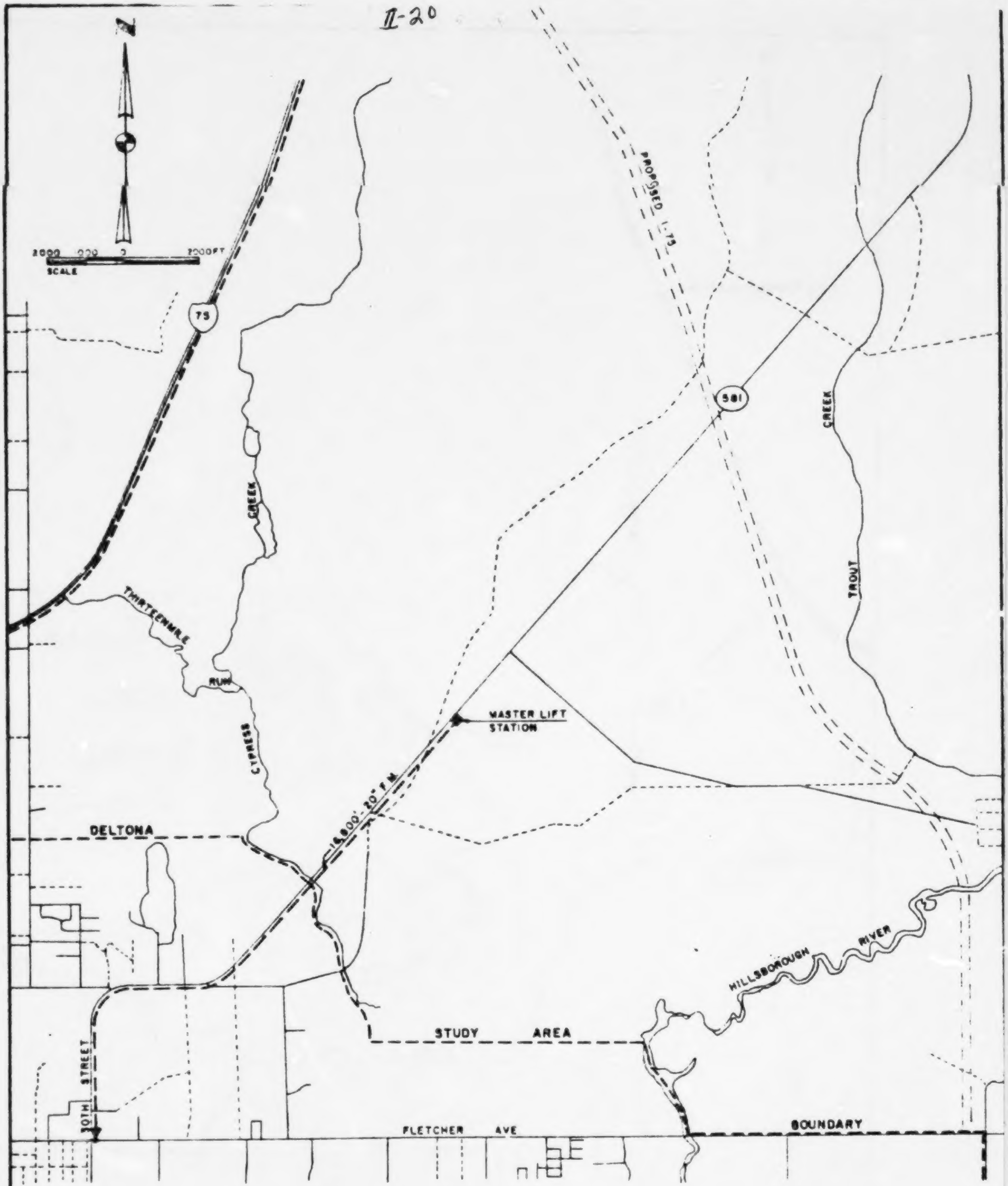
EPA No. C120634010

DAMES & MOOR

FIGURE II-6


N
2000 1000 0 2000FT
SCALE
75
PROPOSED I-75
581
CREEK
TROUT
CREEK
THIRTEENMILE
RUN
CYPRESS
MASTER LIFT
STATION
16,800'-20" F.M.
DELTONA
HILLSBOROUGH RIVER
STUDY AREA
30TH STREET
FLETCHER AVE
BOUNDARY

COUNTY ALTERNATIVE D3
PUMP TO TAMPA

SOURCE:
SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

CENTRAL HILLSBOROUGH COUNTY - TAMPA
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EPA C120634010

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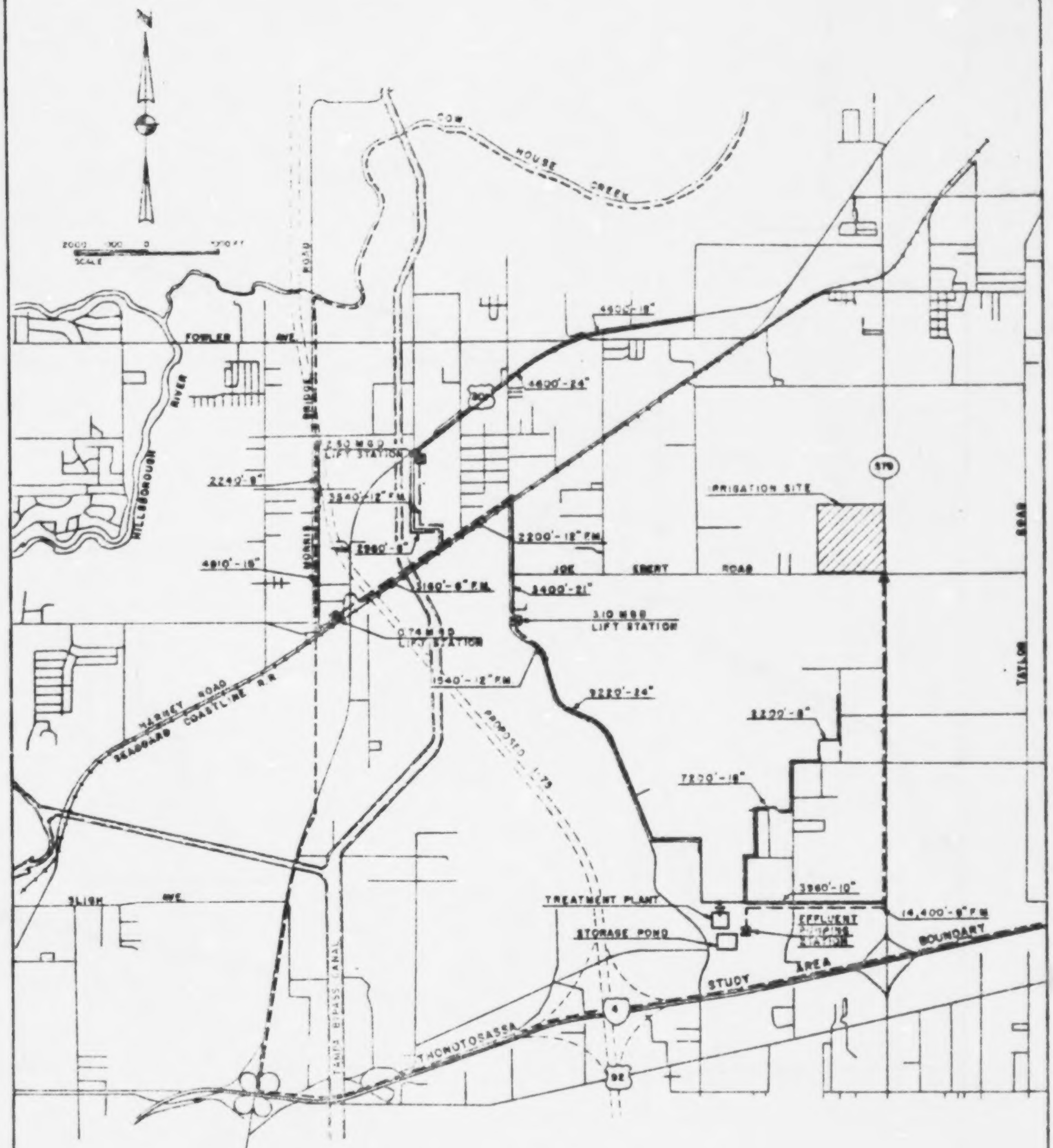
FIGURE II-7


N
2000 1000 0 2000 FT.
SCALE
COW HOUSE CREEK
HILLSBOROUGH RIVER
FOWLER AVE.
MORRIS BRIDGE ROAD
2.50 MGD LIFT STATION
2240'-8"
3540'-12" FM
2960'-8"
4810'-15"
3160'-8" FM
0.74 MGD LIFT STATION
1540'-12" FM
HARNEY ROAD
SEABOARD COASTLINE R.R.
4900'-18"
4600'-24"
301
2200'-12" FM
JOE EBERT ROAD
3400'-21"
3.10 MGD LIFT STATION
9220'-24"
579
IRRIGATION SITE
TAYLOR ROAD
3220'-8"
7220'-18"
3960'-10"
TREATMENT PLANT
STORAGE POND
EFFLUENT PUMPING STATION
14,400'-8" FM
STUDY AREA BOUNDARY
PROPOSED I-75
SLIGH AVE.
TAMPA BYPASS CANAL
THONOTOSASSA
4
92

COUNTY ALTERNATIVE TI

SECONDARY TREATMENT/SPRAY IRRIGATION

SOURCE
SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

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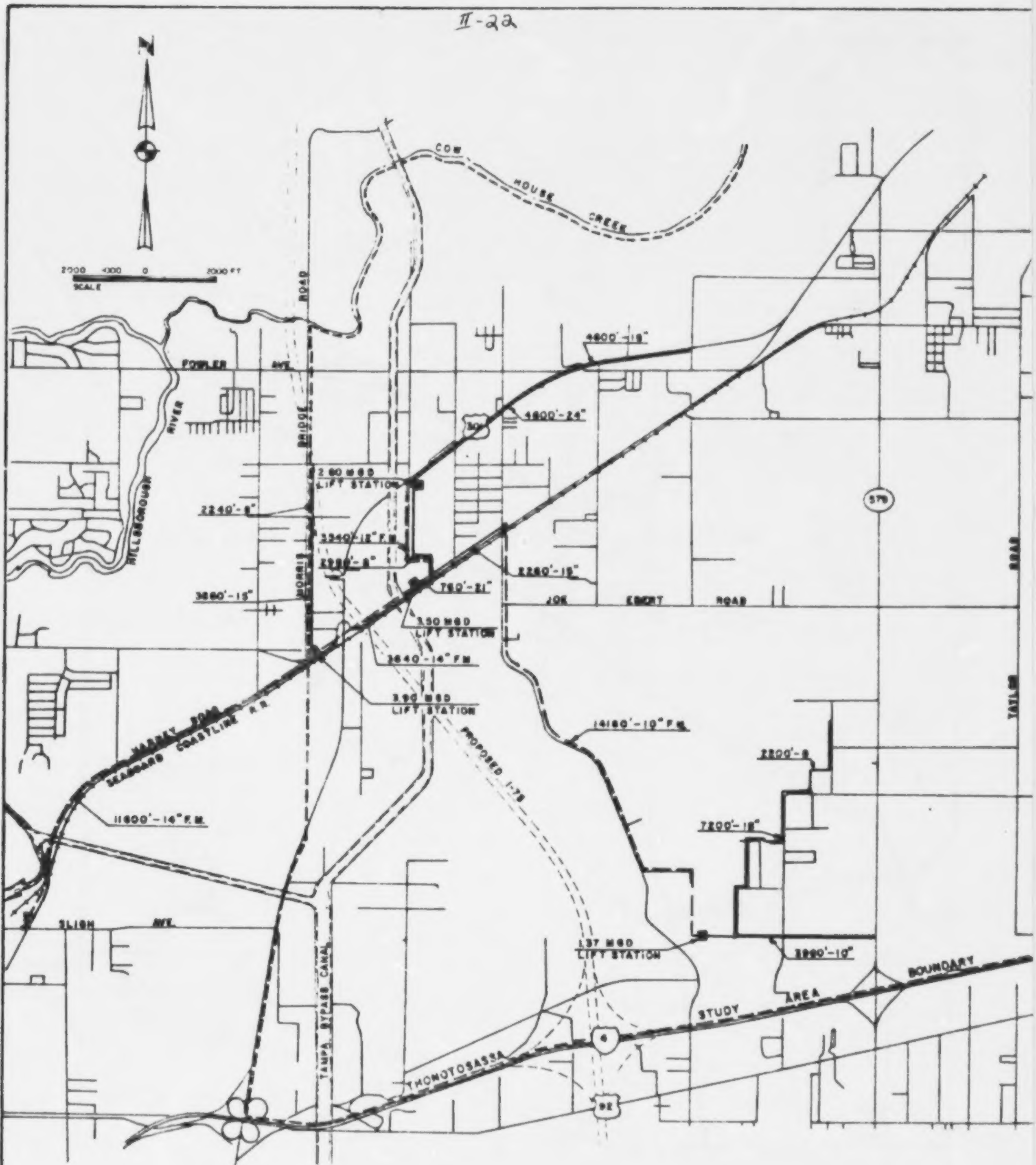
ENVIRONMENTAL REPORT
EPA No C120634010 **DAMES & MOORE**
FIGURE II-8


N
2000 4000 0 2000 FT
SCALE
COW HOUSE CREEK
HILLSBOROUGH RIVER
FOWLER AVE.
MORRIS BRIDGE ROAD
4800'-18"
4800'-24"
301
2.60 MGD LIFT STATION
2240'-8"
3340'-12" F.M.
2980'-8"
3860'-15"
2260'-15"
760'-21"
JOE EBERT ROAD
3.50 MGD LIFT STATION
3640'-14" F.M.
3.90 MGD LIFT STATION
579
TAYLOR ROAD
HARNEY ROAD
SEABOARD COASTLINE R.R.
PROPOSED I-75
14180'-10" F.M.
2200'-8
7200'-18"
11600'-14" F.M.
SLIGH AVE.
1.37 MGD LIFT STATION
2990'-10"
TAMPA BYPASS CANAL
STUDY AREA BOUNDARY
THONOTOSASSA
4
92

COUNTY ALTERNATIVE T3

PUMP TO TAMPA

SOURCE

SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

CENTRAL HILLSBOROUGH COUNTY-TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA C120634010

DAMES & MOORE

FIGURE II - 9

Both of these alternatives include construction of wastewater collection and transmission facilities in Sewer District 3A. Wastewater flows for both alternatives are projected to be 0.55 mgd. The EAC of alternative T1 is $819,930 and $812,760 for alternative T3.

Under the "No Action" alternative, wastewater would be treated and disposed using individual septic tank systems. If, in the future, the need for a regional system can be demonstrated, then EPA might approve a connection to the TSA system.

Brandon Study Area

The Brandon Study Area is scattered with numerous residential developments which are concentrated in Sewer Districts 4A, 4B and 4D. The Faulkenberg industrial area, which includes Sabal Industrial Park, is located in Sewer District 4A. Urban transition development of these sewer districts is projected. Sewer District 4C is projected to remain rural with some small areas of suburban development. The 201 Facilities Plan concluded that facilities for wastewater collection, treatment and disposal will be required for Sewer Districts 4A, 4B and 4D.

Wastewater Treatment and Disposal Alternatives - Soil and ground water conditions within and near the study area are suitable for spray irrigation. Discharge of treated wastewater to the Alafia River may also be possible based on the results of a wasteload allocation study. Since it was unknown what level of treatment would be required, both secondary treatment plus nitrification and advanced waste treatment were evaluated for alternatives considering discharge of effluent to the Alafia River.

Four alternatives for the treatment and disposal of wastewater within the Brandon Study Area were considered for further evaluation. These alternatives were: B1, construct a facility to treat all of the wastewater within the study area using secondary treatment plus nitrification and discharge the effluent to the Alafia River; B3, construct a facility in the study area to provide secondary treatment of wastewater with disposal of the effluent by spray irrigation; B13, collect and convey all wastewater to the TSA for treatment at Tampa's Hookers Point facility; and, the "No Action" alternative. Alternatives, B1, B3 and B13 are shown in Figures II-10, II-11 and II-12, respectively.

All of these alternatives are based on the treatment and disposal of wastewater from Sewer Districts 4A, 4B and 4D. The projected wastewater flow is 9.72 mgd. The EAC of alternative B1 is $6.6 million, $6.4 million for alternative B3 and $8.9 million for alternatve B13.

The "No Action" alternative is envisioned to result in the continued use of septic tank systems and percolation ponds for the treatment and disposal of wastewater.

Wastewater Collection and Transmission Alternatives - Two alternatives were also evaluated for the collection and transmission of wastewater within the Brandon Study Area. The first alternative is to collect and transmit wastewater from all of the phases shown in Figure II-10.

Hillsborough County has granted approval for a number of proposed land developments. These developments will greatly exceed the projected population levels for the County. It is therefore difficult to forecast which of the approved developments will actually be constructed and where major population concentrations

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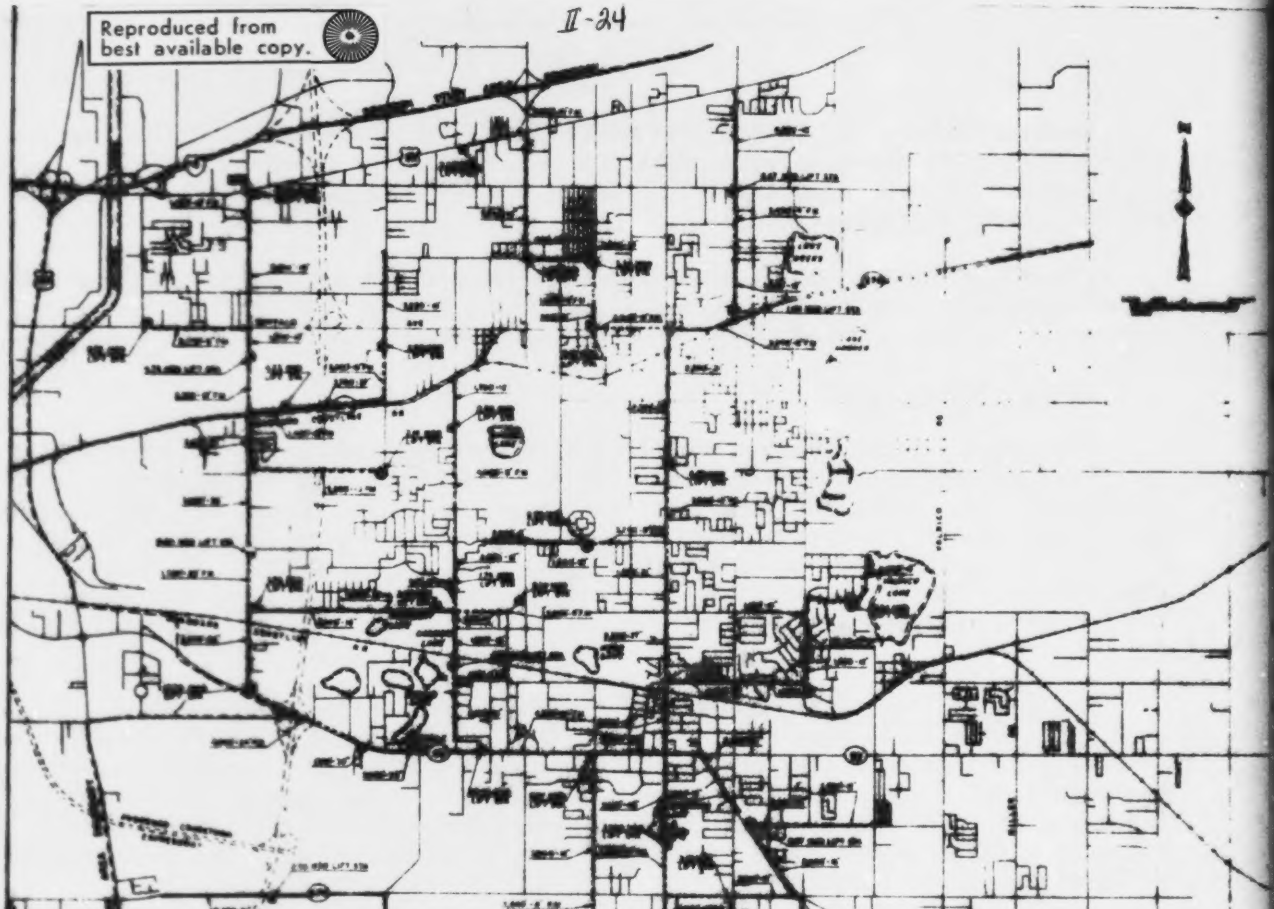

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EPA No. C120634010

COUNTY ALTERNATIVE B1

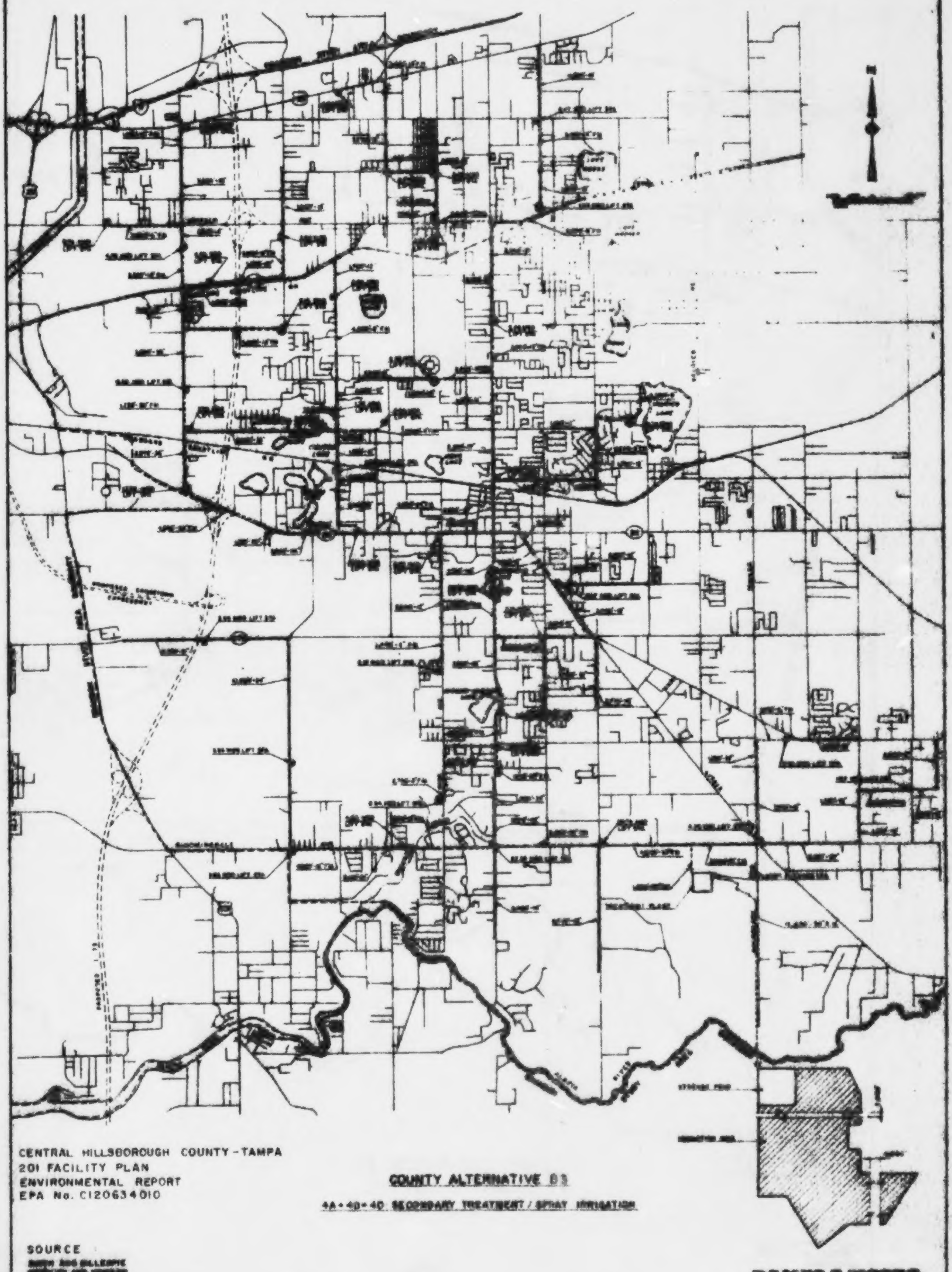
4A+4B+4C SECONDARY TREATMENT / NITRIFICATION / DISCHARGE TO ALAFIA RIVER

SOURCE

[illegible]

DAMES & MOORE

FIGURE II-10



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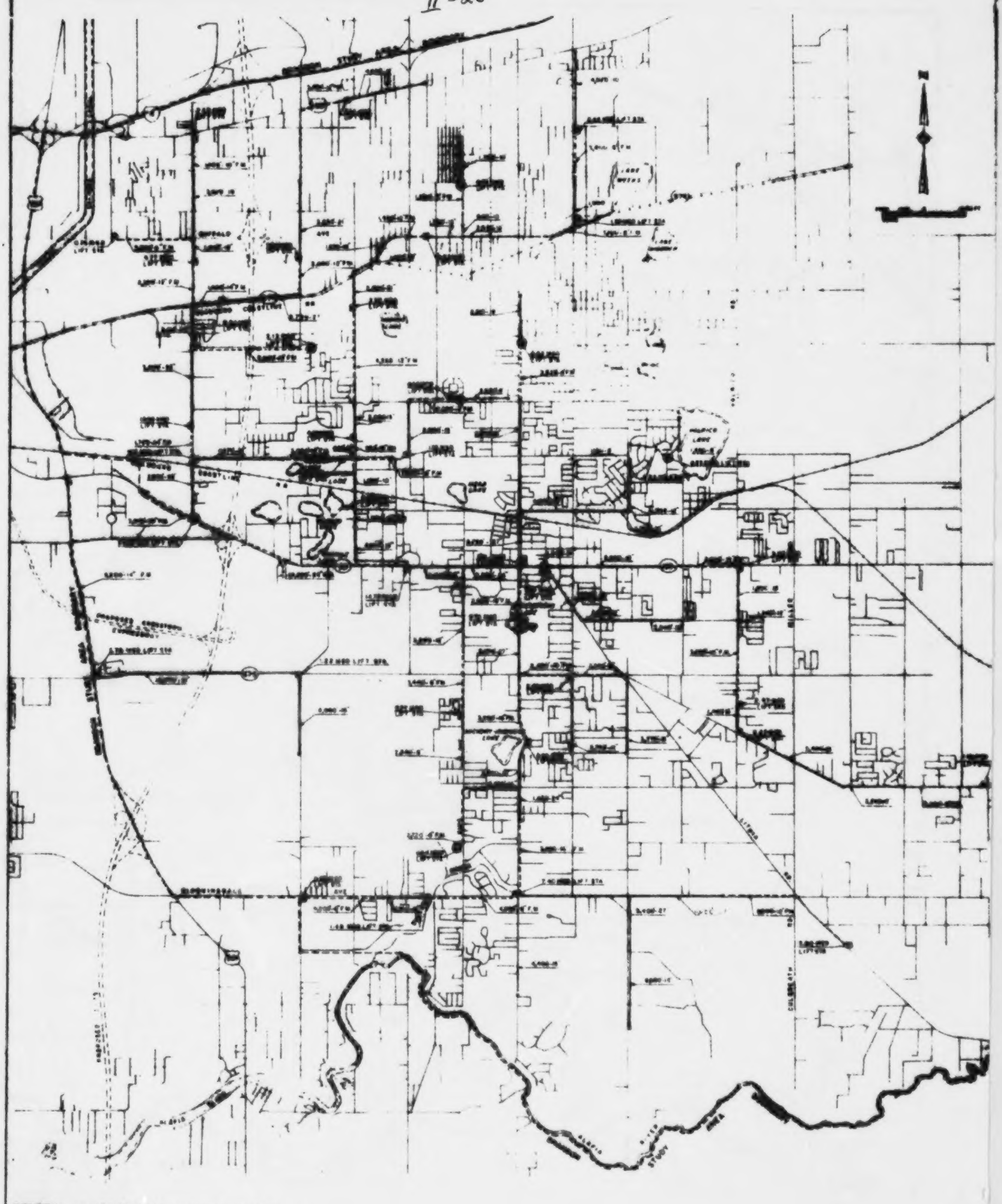
COUNTY ALTERNATIVE B3

4A + 4D + 4D SECONDARY TREATMENT / SPRAY IRRIGATION

SOURCE
SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

DAMES & MOORE

FIGURE II-11



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EPA No. C120634010

COUNTY ALTERNATIVE B13

4A + 4B + 4D PUMP TO TAMPA

SOURCE :
SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

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DAMES & MOORE

FIGURE II- 12

will be located by the year 1990. The second alternative was developed to respond to these uncertainties.

The second alternative does not provide sewer service for areas currently serviced by septic systems or for areas suitable for septic tank development in the future. Approval would be granted by EPA for only those phases scheduled for construction by the year 1990. Review of additional sewer needs would be performed after the results of the 1990 census became available.

Riverview-Gibsonton Study Area

Major areas of residential development in the Riverview-Gibsonton Study Area include Riverview, Gibsonton and Progress Village. Industrial development areas include Port Sutton, Adamsville and the Gibsonton industrial area north of the Alafia River. Urban transition development in Sewer Districts 5A and 5B and suburban development in Sewer Districts 5C and 5D are projected for the future. The 201 Facilities Plan concluded that facilities for wastewater collection, treatment and disposal will be required for Sewer Districts 5A and 5B.

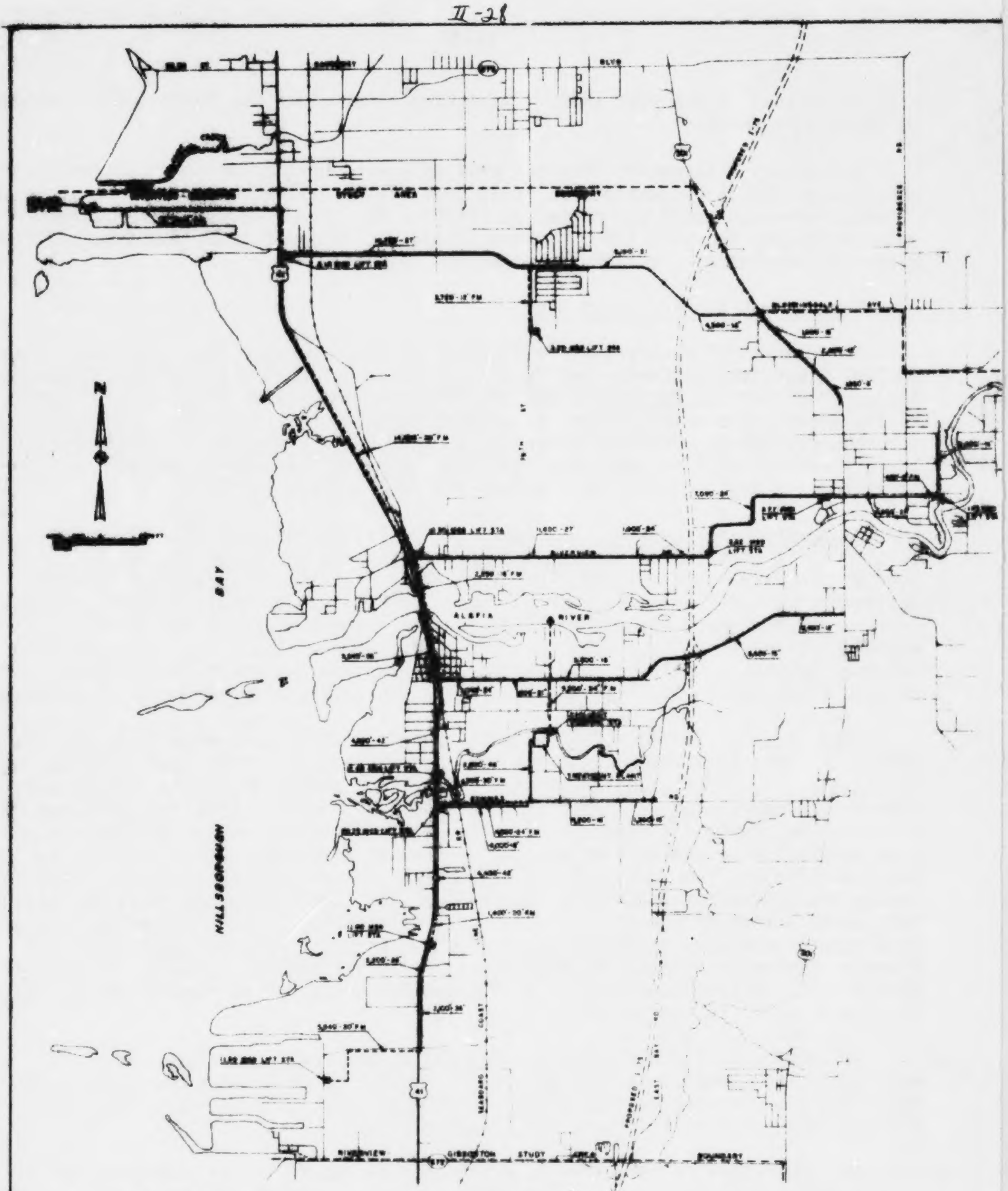
Wastewater Treatment and Disposal Alternatives - Soil and ground water conditions in portions of the study area are suitable for spray irrigation. However, few areas are suitable for septic tank systems. Discharge of treated wastewater to the Alafia River or Hillsborough Bay were possible disposal options. In order to implement any alternatives involving these disposal options, a wasteload allocation study would have to be performed. Since it is unknown what level of treatment would be required for discharge to the Alafia River, both secondary treatment plus nitrification and advanced waste treatment were evaluated.

Five alternatives for the treatment and disposal of wastewater from the study area were considered to be cost-effective and warranted further study. These alternatives are: RG1, construction of a facility within the study area to provide secondary treatment plus nitrification of wastewater with disposal of effluent by discharge to the Alafia River; RG4, construction of a facility within the study area to provide secondary treatment of wastewater with disposal of effluent by spray irrigation; RG6, construction of pumping stations and transmission lines to convey the wastewater to the TSA for treatment at Tampa's Hookers Point facilities; RG7, construction of pumping stations and transmission lines to convey wastewater to proposed secondary treatment facilities in the South Hillsborough County 201 Planning Area with disposal of effluent by spray irrigation; and, the "No Action" alternative. Alternatives RG1, RG4, RG6 and RG7 are shown in Figures II-13, II-14, II-15 and II-16, respectively.

All of these alternatives are based on the treatment and disposal of wastewater from Sewer Districts 5A and 5B. Projected wastewater flows are 6.95 mgd. The EAC's of the various alternatives are: RG1, $4.0 million; RG4, $3.8 million; RG6, $4.8 million; and, RG7, $3.7 million.

The "No Action" alternative is envisioned to result in the continued use of septic tank systems and percolation ponds for the treatment and disposal of future wastewater needs.

Wastewater Collection and Transmission Alternatives - Two alternatives for the collection and transmission of wastewater within the Riverview-Gibsonton Study Area were evaluated. The first alternative is to provide wastewater collection facilities to all of the areas shown in Figure II-13.


N
HILLSBOROUGH
BAY
ALAFIA
RIVER
RIVERVIEW
GIBSONTON
STUDY
AREA
BOUNDARY
SEABOARD
COAST
PROPOSED I-75
EAST BAY RD
41
301

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COUNTY ALTERNATIVE RG1

5A + 5B SECONDARY TREATMENT / NITRIFICATION / DISCHARGE TO ALAFIA RIVER

SOURCE :
SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

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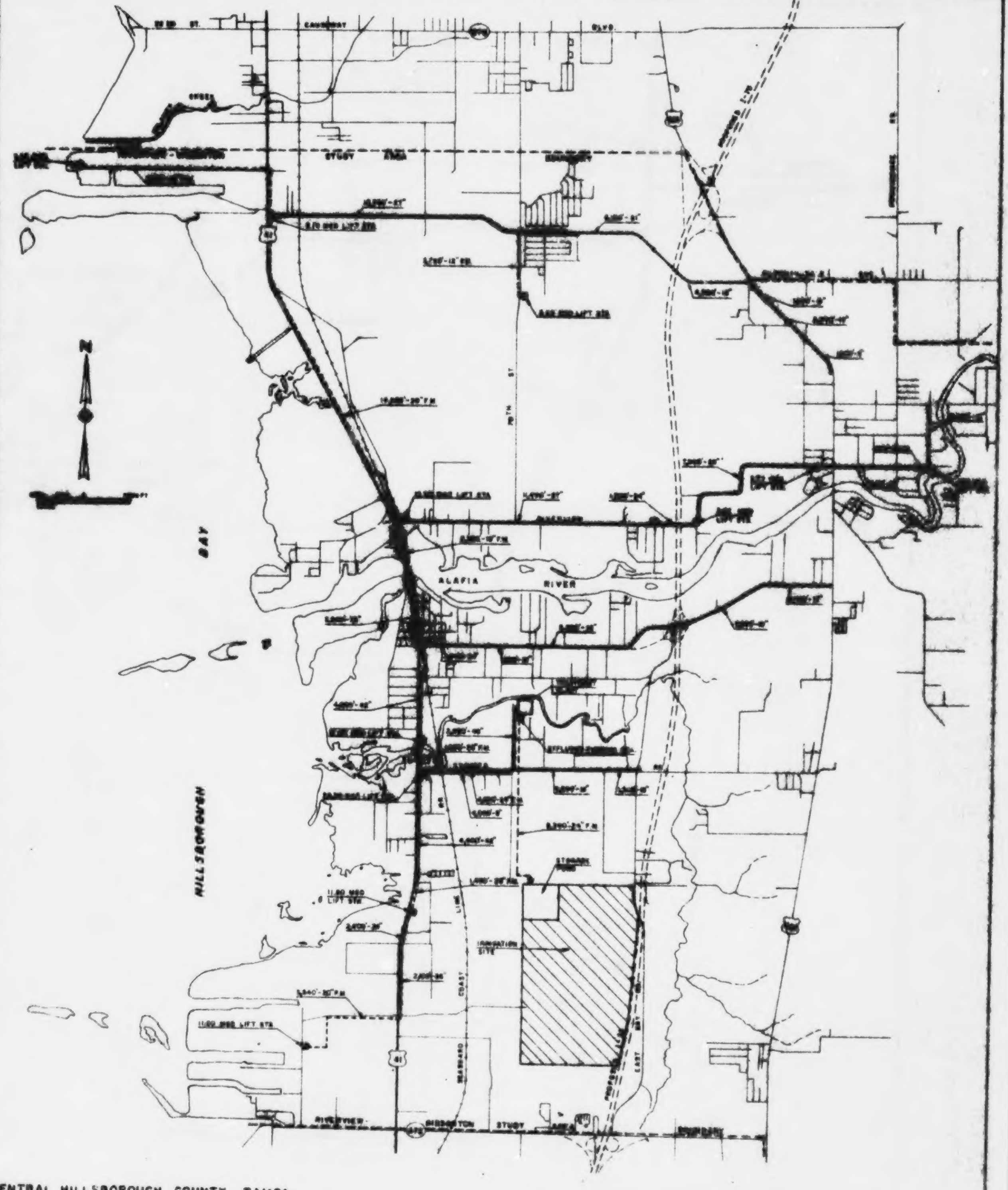
FIGURE II-13


N
HILLSBOROUGH
BAY
ALAFIA RIVER
78TH ST.
SEABOARD COAST LINE
41
STUDY AREA
11.00 MGD LIFT STA
11.00 MGD LIFT STA
IRRIGATION SITE
STORAGE POND
RIVERVIEW
GIBSONTON STUDY AREA BOUNDARY

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COUNTY ALTERNATIVE R04

5A + 5B: SECONDARY TREATMENT/

SPRAY IRRIGATION

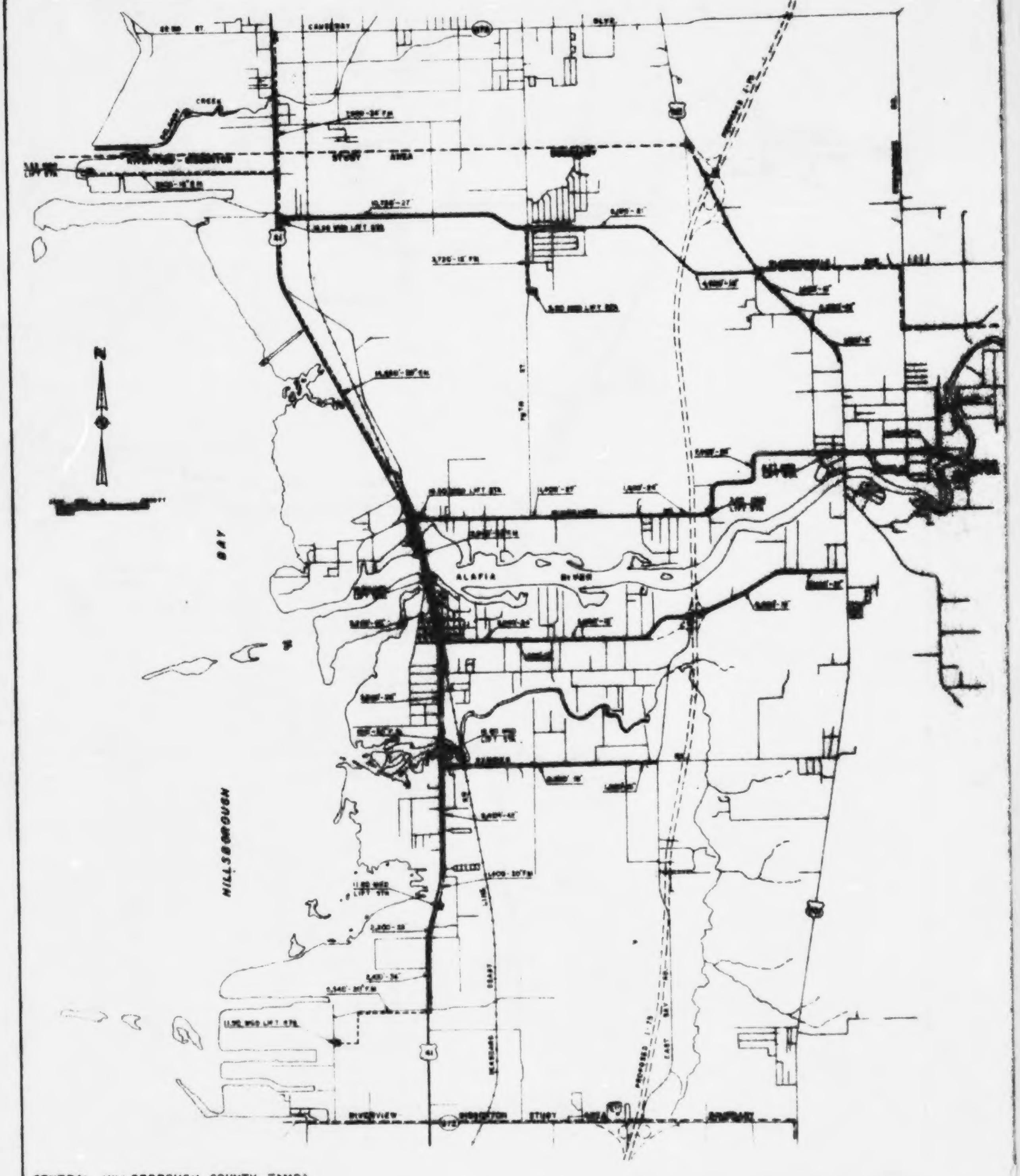
SOURCE:

SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

DAMES & MOORE

FIGURE II-14

II-30


CAUSEWAY
BLVD.
CREEK
STUDY AREA
2,000'-24" F.M.
10,720'-27"
3,730'-16" F.M.
41
N
BAY
HILLSBOROUGH
ALAFIA RIVER
3,400'-36"
3,540'-20" F.M.
RIVERVIEW
GIBSONTON STUDY AREA BOUNDARY
672
SEABOARD
COAST
PROPOSED I-75
EAST BAY RD.

CENTRAL HILLSBOROUGH COUNTY-TAMPA
201 FACILITY PLAN
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COUNTY ALTERNATIVE RG6

5A. PUMP TO TAMPA

5B. PUMP TO TAMPA

SOURCE :
SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

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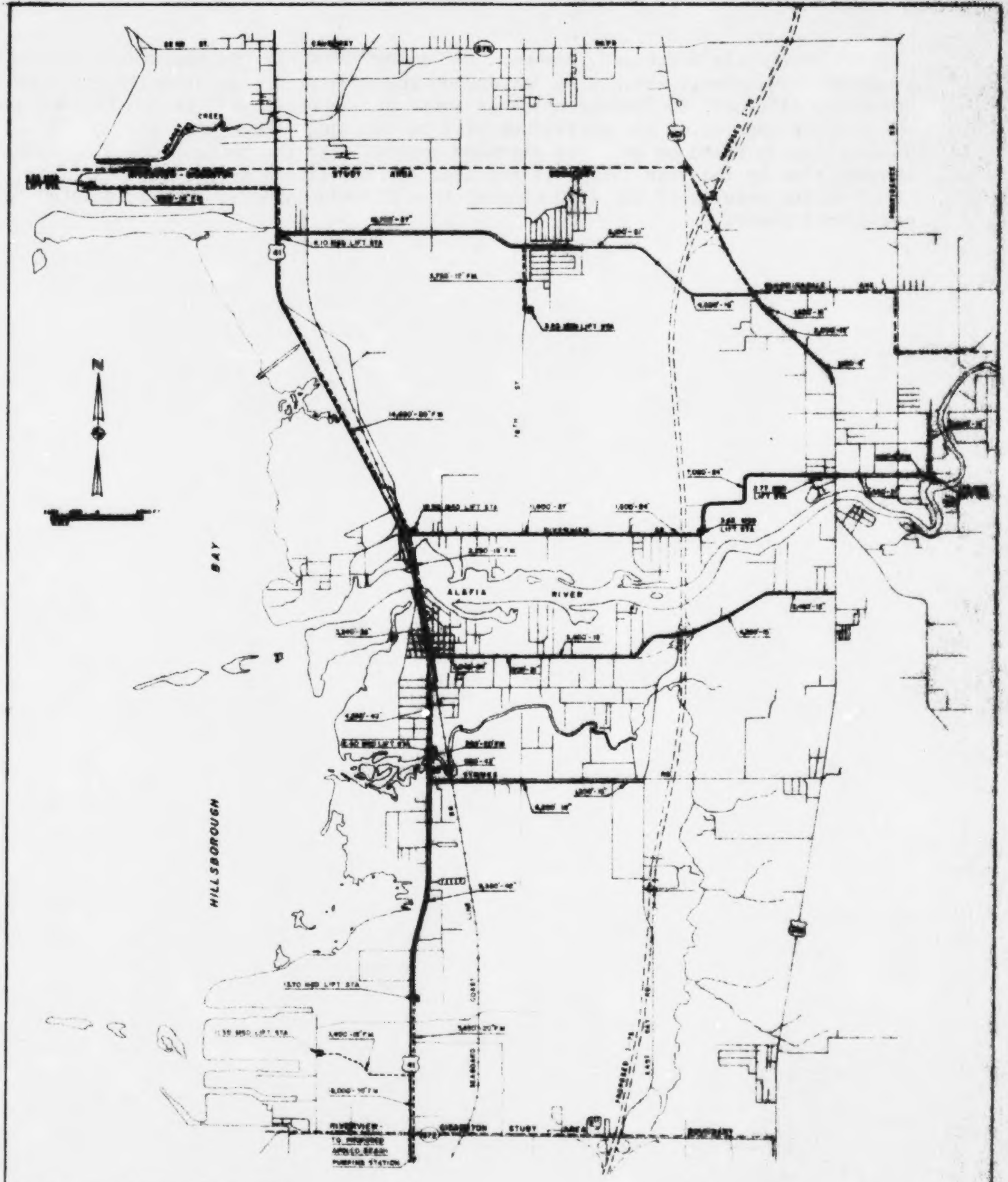
FIGURE II- 15


ST.
STUDY AREA
CREEK
4.10 MGD LIFT STA
3,750' 12" FM
3.50 MGD LIFT STA
16,000'-30" FM
N
BAY
10.80 MGD LIFT STA
1,600'-27"
1,600'-24"
7,000'-24"
2.77 MGD LIFT STA
3.60 MGD LIFT STA
2,250' 16" FM
ALAFIA
RIVER
HILLSBOROUGH
1.370 MGD LIFT STA
1.30 MGD LIFT STA
8,000'-10" FM
COAST
SEABOARD
PROPOSED I-75
EAST
RD
STUDY
RIVERVIEW-
TO PROPOSED
APOLLO BEACH
PUMPING STATION
41
672

CENTRAL HILLSBOROUGH COUNTY - TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

COUNTY ALTERNATIVE NO7

5A + 5B PUMP TO SOUTH COUNTY

SOURCE :
SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

DAMES & MOORE

FIGURE II-16

As previously discussed, however, Hillsborough County has approved a number of proposed developments which will far exceed the projected population levels. It is presently difficult to foresee which of these developments will be constructed and where major population concentrations will be located. Therefore, the second alternative is based on granting planning approval for the phases scheduled for construction by the year 1990. If the need for additional service is justified based on the results of the 1990 census, then planning approval may be granted for additional phases.

CHAPTER III - DESCRIPTION OF PREFERRED ALTERNATIVE

PART A: INTRODUCTION

The underlying theme of the EIS process is that the provision of wastewater services should be compatible with efforts to preserve and protect the area's physical, biological and historical resources. The EPA, therefore, must explore all available mechanisms to achieve an environmentally sound alternative that is sensitive to economic realities. The selection of the least costly alternative is not EPA's only aim, but rather the selection of an environmentally protective alternative that is locally affordable.

The preferred alternatives are briefly discussed in the following by service area: Part B discusses the preferred alternative for the Tampa Service Area; and Part C discusses the preferred alternative for the County Service Area. More detailed descriptions of the alternatives are found in the 201 Facility Plan and accompanying Study Memorandums.

All of the alternatives were designed to serve the needs of the population projected for the year 2000. Because the study area needs were based on projected population increases, the design conditions used for evaluation of alternatives should not be realized until the year 2000. Therefore, a phased approach to the construction of facilities was developed to meet the wastewater collection, treatment and disposal needs of the area as the wastewater flows increase. The phases of the program were developed to allow maximum use of existing sewerage facilities and greater utilization of new facilities during their design lifetime. The general phasing of the preferred alternatives is also presented in the following sections. More detailed descriptions of the alternative phasing is also included in the 201 Facility Plan and accompanying Study Memorandums.

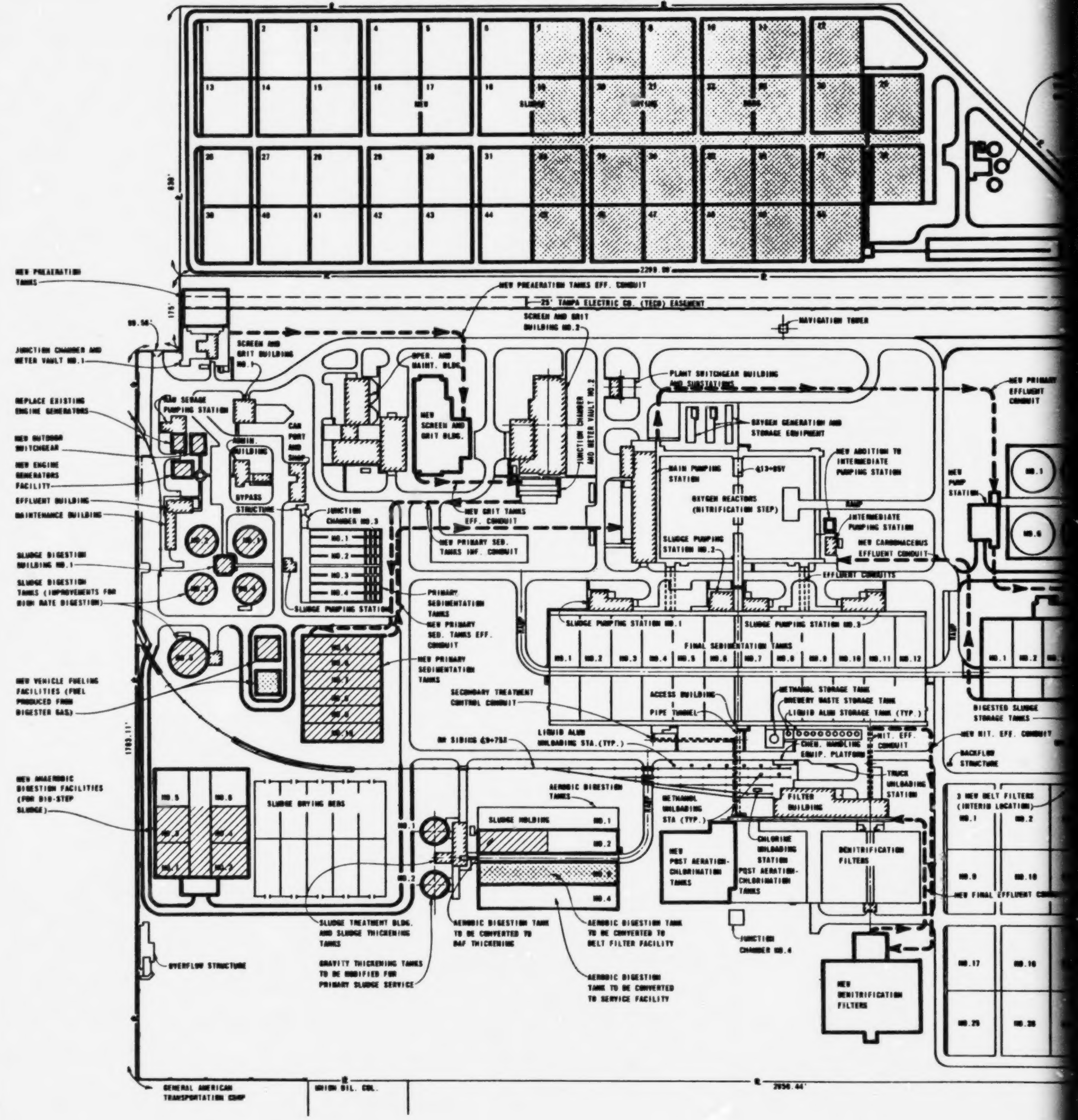
PART B: TAMPA SERVICE AREA (TSA)

1. TREATMENT AND DISPOSAL

The preferred alternative for the treatment and disposal of wastewater is treatment at the City of Tampa's Hookers Point facilities with disposal of effluent to Hillsborough Bay. The level of treatment will be determined by the special wasteload allocation study that is now underway. This alternative will be the most cost-effective, regardless of the level of treatment required.

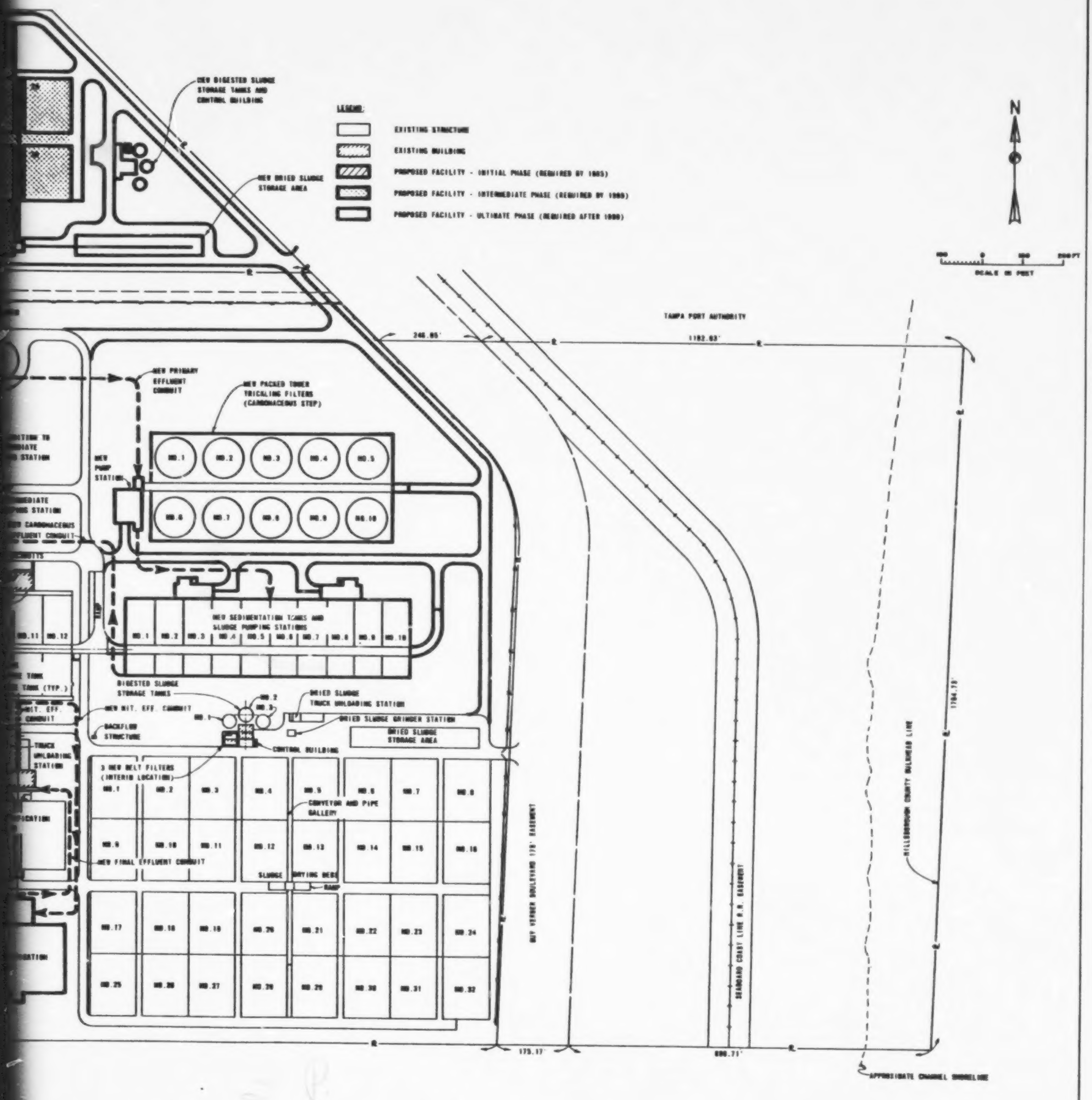
When plant expansions are made, the existing two-step nitrification process will be used followed by denitrification in deep bed filters. The existing high-purity oxygen activated sludge system will be used in the expanded plant as the nitrification step. The existing aerobic digestion facilities will be phased out and the units converted to other uses in the expanded plant. New facilities will include units for capacity expansion, improvements to some of the original process units and units for energy recovery.

Facilities improvement and expansion at the Hookers Point plant have been divided into three improvement phases. These phases are: the Initial Phase, which will comprise those facilities required by 1985; the Intermediate Phase, which will comprise those facilities required through 1990; and, the Ultimate Phase, which will comprise those facilities required after 1990. Individual projects included in each phase are shown on Figure III-1.


NEW PREAERATION TANKS
NEW PREAERATION TANKS EFF. CONDUIT
25' TAMPA ELECTRIC CO. (TECO) EASEMENT
NAVIGATION TOWER
JUNCTION CHAMBER AND METER VAULT NO.1
SCREEN AND GRIT BUILDING NO.1
SCREEN AND GRIT BUILDING NO.2
REPLACE EXISTING ENGINE GENERATORS
RAW SEWAGE PUMPING STATION
NEW OUTDOOR SWITCHGEAR
NEW ENGINE GENERATORS FACILITY
EFFLUENT BUILDING
MAINTENANCE BUILDING
ADMIN. BUILDING
BYPASS STRUCTURE
CAR PORT AND SHOP
OPER. AND MAINT. BLDG.
NEW SCREEN AND GRIT BLDG.
JUNCTION CHAMBER AND METER VAULT NO.2
PLANT SWITCHGEAR BUILDING AND SUBSTATIONS
OXYGEN GENERATION AND STORAGE EQUIPMENT
MAIN PUMPING STATION
OXYGEN REACTORS (NITRIFICATION STEP)
NEW ADDITION TO INTERMEDIATE PUMPING STATION
INTERMEDIATE PUMPING STATION
NEW CARBONACEOUS EFFLUENT CONDUIT
NEW PRIMARY EFFLUENT CONDUIT
NEW PUMP STATION
SLUDGE PUMPING STATION NO.2
EFFLUENT CONDUITS
JUNCTION CHAMBER NO.3
NEW GRIT TANKS EFF. CONDUIT
NEW PRIMARY SED. TANKS INF. CONDUIT
SLUDGE DIGESTION BUILDING NO.1
SLUDGE DIGESTION TANKS (IMPROVEMENTS FOR HIGH RATE DIGESTION)
SLUDGE PUMPING STATION
PRIMARY SEDIMENTATION TANKS
NEW PRIMARY SED. TANKS EFF. CONDUIT
NEW PRIMARY SEDIMENTATION TANKS
SLUDGE PUMPING STATION NO.1
SLUDGE PUMPING STATION NO.3
FINAL SEDIMENTATION TANKS
NEW VEHICLE FUELING FACILITIES (FUEL PRODUCED FROM DIGESTER GAS)
SECONDARY TREATMENT CONTROL CONDUIT
ACCESS BUILDING
PIPE TUNNEL
METHANOL STORAGE TANK
BREWERY WASTE STORAGE TANK
LIQUID ALUM STORAGE TANK (TYP.)
LIQUID ALUM UNLOADING STA. (TYP.)
CHEM. HANDLING EQUIP. PLATFORM
NIT. EFF. CONDUIT
NEW NIT. EFF. CONDUIT
BACKFLOW STRUCTURE
DIGESTED SLUDGE STORAGE TANKS
TRUCK UNLOADING STATION
FILTER BUILDING
METHANOL UNLOADING STA (TYP.)
CHLORINE UNLOADING STATION
NEW POST AERATION-CHLORINATION TANKS
POST AERATION-CHLORINATION TANKS
DENITRIFICATION FILTERS
NEW DENITRIFICATION FILTERS
3 NEW BELT FILTERS (INTERIM LOCATION)
NEW FINAL EFFLUENT CONDUIT
JUNCTION CHAMBER NO.4
NEW ANAEROBIC DIGESTION FACILITIES (FOR BIO-STEP SLUDGE)
SLUDGE DRYING BEDS
AEROBIC DIGESTION TANKS
SLUDGE HOLDING
SLUDGE TREATMENT BLDG. AND SLUDGE THICKENING TANKS
GRAVITY THICKENING TANKS TO BE MODIFIED FOR PRIMARY SLUDGE SERVICE
AEROBIC DIGESTION TANK TO BE CONVERTED TO DAF THICKENING
AEROBIC DIGESTION TANK TO BE CONVERTED TO BELT FILTER FACILITY
AEROBIC DIGESTION TANK TO BE CONVERTED TO SERVICE FACILITY
OVERFLOW STRUCTURE
NEW SLUDGE DRYING BEDS
GENERAL AMERICAN TRANSPORTATION CORP
UNION OIL. CO.
2299.00'
2050.44'
1703.11'
630'
175'

CENTRAL HILLSBOROUGH COUNTY-TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

REFERENCE:
SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS


NEW DIGESTED SLUDGE STORAGE TANKS AND CONTROL BUILDING
LEGEND:
EXISTING STRUCTURE
EXISTING BUILDING
PROPOSED FACILITY - INITIAL PHASE (REQUIRED BY 1985)
PROPOSED FACILITY - INTERMEDIATE PHASE (REQUIRED BY 1990)
PROPOSED FACILITY - ULTIMATE PHASE (REQUIRED AFTER 1990)
N
NEW DRIED SLUDGE STORAGE AREA
400 0 400 800 FT
SCALE IN FEET
TAMPA PORT AUTHORITY
246.85'
1182.83'
NEW PRIMARY EFFLUENT CONDUIT
NEW PACKED TOWER TRICKLING FILTERS (CARBONACEOUS STEP)
NO.1
NO.2
NO.3
NO.4
NO.5
NO.6
NO.7
NO.8
NO.9
NO.10
NEW PUMP STATION
INTERMEDIATE PUMPING STATION
CARBONACEOUS EFFLUENT CONDUIT
CONDUITS
NO.11
NO.12
NEW SEDIMENTATION TANKS AND SLUDGE PUMPING STATIONS
TANK
TANK (TYP.)
DIGESTED SLUDGE STORAGE TANKS
DRIED SLUDGE TRUCK UNLOADING STATION
NEW NIT. EFF. CONDUIT
NIT. EFF. CONDUIT
DRIED SLUDGE GRINDER STATION
BACKFLOW STRUCTURE
DRIED SLUDGE STORAGE AREA
CONTROL BUILDING
TRUCK UNLOADING STATION
3 NEW BELT FILTERS (INTERIM LOCATION)
CONVEYOR AND PIPE GALLERY
NEW FINAL EFFLUENT CONDUIT
SLUDGE DRYING BEDS
RAMP
NO.13
NO.14
NO.15
NO.16
NO.17
NO.18
NO.19
NO.20
NO.21
NO.22
NO.23
NO.24
NO.25
NO.26
NO.27
NO.28
NO.29
NO.30
NO.31
NO.32
GUY VERGER BOULEVARD 170' EASEMENT
SEABOARD COAST LINE R.R. EASEMENT
HILLSBOROUGH COUNTY BULKHEAD LINE
1764.78'
175.17'
890.71'
APPROXIMATE CHANNEL SHORELINE

HOOKERS POINT AWT PLANT PROPOSED PLANT EXPANSION AND FACILITIES PHASING

FIGURE III-1

2. WASTEWATER COLLECTION AND TRANSMISSION

The preferred collection and transmission alternative for the TSA is Alternative 2, providing service to all of the areas as shown in Figure II-5 with the exception of the second phase of the Northeast Interceptor. This alternative is the most cost-effective alternative and also the most environmentally sound.

Portions of the area to be served by the second phase of the Northeast Interceptor lie within the Hillsborough River floodplain immediately above the City of Tampa's drinking water intake. As a result of the preferred alternative, EPA does not participate in encouraging the development of these sensitive areas as a result of providing sewer service. The potential for long-range degradation of the Hillsborough River resulting from development of this area and the use of septic tanks can be prevented by the use of sound land use controls instituted by Hillsborough County.

Phasing of the wastewater collection and transmission preferred alternative is discussed in more detail in the 201 Facilities Plan. Considerations related to phasing of the collection system projects included the following:

1. Sewer service needs for areas that are presently developed but unsewered.
2. Sewer service needs for estimated future development for areas that are presently partially developed and have established development patterns.
3. Sewer service needs for estimated future development for areas in which development patterns are not fully established.
4. Requirements to provide hydraulic relief or correct structural deficiencies in existing sewer systems.
5. Elimination of existing interim or package-type treatment facilities.

The expansion of the intercepting and secondary intercepting system was divided into four phases, each for a 5-year period, beginning in 1980. The planned improvements providing hydraulic relief to the existing intercepting and secondary intercepting system were divided into three phases: replacement sewers (1980-1985); flow diversions (1990-2000); and, replacement sewers (1990-2000). The expansion of neighborhood collection systems is, in general, dependant on the programs established for intercepting and secondary intercepting systems. Phasing for neighborhood systems, therefore, was based on developmental characteristics prevailing in various areas as follows:

1. 4WIP Phase, which includes those projects identified in the City's Fourth Wastewater Improvement Program. Such projects will serve areas that are presently fully developed and where intercepting conveyance capacity is available or will become available in the near future.
2. Future Phase 1, which includes projects that will serve areas that are now partially developed and where development patterns (streets) have been established.
3. Future Phase 2, which includes projects that will serve areas that have little existing development and where development patterns are not defined.

The preferred intercepting and secondary intercepting facilities and proposed phasing are summarized in Table III-1. The proposed relief facilities and phasing are summarized in Table III-2.

PART C: COUNTY SERVICE AREA (CSA)

1. DELTONA STUDY AREA

The preferred alternative for the Deltona Study Area is the "No Action" alternative. The Deltona Study Area is currently undeveloped. Much of the study area lies within the wetlands and floodplains of the Hillsborough River. The preferred alternative is consistant with EPA's guidelines that Federal funds not be spent on sewers that would be developmental in nature or that would encourage development in wetland or floodplain areas.

2. THONOTOSASSA STUDY AREA

The preferred alternative for the Thonotosassa Study Area is the "No Action" alternative. The Thonotosassa Study Area is currently only sparsely developed. The preferred alternative precludes the use of Federal funds to encourage development in an area where no water quality problems exist or are projected to exist. After the 1990 population census, the need for service in this area can be evaluated again.

2. BRANDON STUDY AREA

Wastewater Treatment and Disposal

The preferred alternative for wastewater treatment and disposal in the Brandon Study Area is Alternative B3, construction of a treatment plant with secondary treatment and disposal of effluent by spray irrigation. This alternative is the most cost-effective, provides the needed treatment capacity and recycles wastewater.

Construction of the treatment facilities will be performed in two phases: one during the period 1980-1985; and, one during the period 1990-1995. The first phase includes construction of the first stage of the treatment plant consisting of four 1.5 MGD modules for a total design capacity of 6.0 MGD. During the second phase, the treatment plant capacity may be expanded to 9.0 MGD.

Wastewater Collection and Transmission

The preferred alternative for wastewater collection and transmission in the Brandon Study Area is Alternative 2, which does not provide sewer service for areas currently serviced by septic tanks or for areas suitable for septic tank development in the future. Approval would be granted by EPA for only those phases scheduled for construction by the year 1990. Additional sewer needs will be reviewed after the results of the 1990 census become available.

Water quality problems resulting from septic tank usage are not considered by EPA to be significant enough to justify the expenditure of funds to sewer all areas currently on septic tank systems. The 201 Facility Plan consultant will evaluate each area now on septic tanks to determine the need for service.

The preferred alternative is divided into two phases: Phase I, 1980-1985; and Phase II, 1985-1990. Phase I improvements include construction of the intercepting

TABLE III-1 (Cont'd)

TAMPA SERVICE AREA
PROPOSED INTERCEPTING AND SECONDARY INTERCEPTING FACILITIES PHASING

Division No.	Description	Phase
4C14	Florida Avenue Sec. Intercepting Sewer	1980-85
4G16	Lake Ellen Road Pumping Station	1985-90
4G13	Midlake Drive Pumping Station	1980-85
4G11	Fowler Avenue Pumping Station	1980-85
4F9	Lake Ellen Road Force Main	1985-90
4F9A	Eckles Drive Force Main	1980-85
4F9A	Florida Avenue Force Main	1980-85
	SOUTHERN SECONDARY INTERCEPTING SYSTEM	
4G24	Manhattan Avenue Pumping Station	1980-85
4G15	Averill Avenue Pumping Station	1980-85
4G19	Sheridan Road Pumping Station	1980-85
4F11D	Manhattan Avenue Force Main	1980-85
4F11C	Bay Avenue Force Main	1980-85
4F11B	Price Avenue Force Main	1980-85
	WEST TAMPA SECONDARY INTERCEPTING SYSTEM	
4G22	Lincoln Avenue Pumping Station	1980-85
4G21	MacDill Avenue Pumping Station	1980-85
4F12	Himes Avenue Force Main	1980-85
	KIRBY STREET SECONDARY INTERCEPTING SYSTEM	
4C13	Kirby Street Sec. Intercepting Sewer	1980-85
	CENTRAL INTERCEPTING SYSTEM RELIEF FACILITIES	
4G8	Buffalo Avenue Pumping Station	1980-85
4G10	55th Street Pumping Station	1980-85
4G7	Adalee Avenue Pumping Station	1980-85
4G9	29th Street Pumping Station	1980-85
4F8	Buffalo Avenue Force Main	1980-85
4F8	26th Avenue Force Main	1980-85
4F8	21st Avenue Force Main	1980-85
4F8	Sligh Avenue Force Main	1980-85
	INTERBAY INTERCEPTING SYSTEM RELIEF FACILITIES	
4C8	Fairoaks Avenue Sec. Intercepting Sewer	1985-90
4F13	Leona Street Force Main	1980-85
4F13	North B Street Force Main	1980-85

TABLE III-1

TAMPA SERVICE AREA
PROPOSED INTERCEPTING AND SECONDARY INTERCEPTING FACILITIES PHASING

Division No.	Description	Phase
	NORTHEAST INTERCEPTING SYSTEM	
4A4	Sligh Avenue Intercepting Sewer Section 1, to 56th Street	1980-85
4G4	43rd Street Pumping Station	1980-85
4F4	43rd Street Force Main	1980-85
	EASTERN INTERCEPTING SYSTEM	
4A6	Adamo Drive Intercepting Sewer	1995-2000
4A7	Broadway-Orient Road Intercepting Sewer	1985-90
4G6	78th Street Pumping Station	1995-2000
4FG	Orient Road Force Main	1995-2000
	SOUTHEAST INTERCEPTING SYSTEM	
5A2	Causeway Boulevard Intercepting Sewer	1990-95
5G3	Causeway Boulevard Pumping Station	1990-95
5F2	Causeway Boulevard Force Main	1990-95
	UNIVERSITY SECONDARY INTERCEPTING SYSTEM	
4C6	52nd Street Sec. Intercepting Sewer	1985-90
4C4	22nd Street and 143rd Avenue Secondary Interceptinging Sewers	1980-85
4G25	52nd Street Pumping Station	1985-90
4G14	Livingston Avenue Pumping Station	1985-90
4F10	Fletcher Avenue Force Main	1985-90
4F10	Livingston Avenue Force Main	1985-90
	SULPHUR SPRINGS SECONDARY INTERCEPTING SYSTEM	
4C1	Busch Boulevard Sec. Intercepting Sewer	1980-85
4C9	Yukon Street Sec. Intercepting Sewer	1980-85
4G17	37th Street Pumping Station	1980-85
4F7	Yukon Street Force Main	1980-85
	NORTHWEST SEC. INTERCEPTING SYSTEM	
4C3	Midlake Drive Sec. Intercepting Sewer	1980-85
4C2	Country Club Drive Sec. Intercepting Sewer	1980-85
4C10	131st Avenue Sec. Intercepting Sewer	1980-85

TABLE III-1 (Cont'd)

TAMPA SERVICE AREA
PROPOSED INTERCEPTING AND SECONDARY INTERCEPTING FACILITIES PHASING

Division No.	Description	Phase
	BAYSHORE BOULEVARD RELIEF FACILITIES	
5G4	Bayshore Boulevard Relief Pump Station	1990-2000
5F3	Bayshore Boulevard Relief Force Main	1990-2000
	FOREST HILLS RELIEF FACILITIES	
5G5	Forest Hills Relief Pumping Station	1990-2000
5F4	Forest Hills Relief Force Main	1990-2000

TABLE III-2

TAMPA SERVICE AREA
SUMMARY OF PROPOSED RELIEF FACILITIES PHASING

Line No.	Description	Phase
	HYDRAULIC RELIEF FACILITIES (REPLACEMENT SEWERS)	
218-222	South River Intercepting Sewer	1980-85
195-201	Comanche Avenue Sec. Intercepting Sewer	1980-85
253-254	Bougainvillea Avenue Sec. Intercepting Sewer	1980-85
233-235	Taliaferro Avenue Sec. Intercepting Sewer	1980-85
193-194 208	Wellswood Sec. Intercepting Sewer	1980-85
156-157 166-167	West River Intercepting Sewer	1980-85
164-165 258-259 300-301	North Boulevard Sec. Intercepting Sewer	1980-85
266-273	Plymouth - 21st Street Section Intercepting Sewer	1980-85
88 90-95	Palma Ceia Sec. Intercepting Sewer	1980-85
63-64	24th Street Sec. Intercepting Sewer	1980-85
125-133 135-137 140 142-155	Downtown Area Sec. Intercepting Sewer	1980-85
180-192	Seminole Heights Intercepting Sewer	1980-85
209-210	Otis Avenue Sec. Intercepting Sewer	1990-2000
168-172 175-176	West Tampa Sec. Intercepting Sewer	1990-2000
79-81	Ballast Point Sec. Intercepting Sewer	1990-2000
8-10 12-14 403-407	Broadway Intercepting Sewer	1990-2000
15-18	Tampa East Industrial Park Secondary Intercepting Sewer	1990-2000
1-3 408-410	Main Outlet Intercepting Sewer	1990-2000

TABLE III-2 (Cont'd)

TAMPA SERVICE AREA
SUMMARY OF PROPOSED RELIEF FACILITIES PHASING

Line No.	Description	Phase
	HYDRAULIC RELIEF FACILITIES (FLOW DIVERSIONS)	
243-248	Bougainvillea Avenue Sec. Intercepting Sewer (Into: Division 4C7, Fletcher Avenue Sec. Intercepting Sewer)	1980-85
236-238	Temple Terrace Highway Sec. Intercepting Sewer (Into: Division 4C7, Fletcher Avenue Sec. Intercepting Sewer)	1980-85
224-227	Sulphur Springs Sec. Intercepting Sewer (Into: Division 4C7, Fletcher Avenue Sec. Intercepting Sewer)	1980-85
213-217	Forest Hills Drive Sec. Intercepting Sewer (Into: Division 4G12, Country Club Drive Pump Station; Division 4F9, Florida Avenue Force Main; Division 4A5, 131st Avenue (W) Intercepting Sewer)	1980-85
313-316	North Boulevard Sec. Intercepting Sewer (Same as Lines 213-217)	1980-85
317-321	Sitka Street Sec. Intercepting Sewer (Into: Division 4C13, Kirby Street Sec. Intercepting Sewer)	1980-85
260-265	Plymouth - 21st Street Sec. Intercepting Sewer (Into: Division 4G7, Adalee Street Pumping Station)	1980-85
114-117	West Shore Boulevard Sec. Intercepting Sewer (Into: Division 4F13, Leona Steet Force Main)	1980-85
96-101	Manhattan Sec. Intercepting Sewer - North (Into: Division 4F13, North B Street Force Main)	1980-85
102-104	Manhattan Sec. Intercepting Sewer - North (Into: Division 4B1, Clark Avenue Intercepting Sewer)	1980-85
84-87	Palmira Sec. Intercepting Sewer (Into: Division 4G5, San Carlos Pumping Station and Abandonment Of San Jose Pump Station)	1980-85
302-305	Cleveland Street Sec. Intercepting Sewer (Into: Division 4F13, N. "B" Street Force Main)	1980-85
306-312	Occident Street Sec. Intercepting Sewer (Into: Division 4F13, N "B" Street Force Main)	1980-85

TABLE III-2 (Cont'd)

TAMPA SERVICE AREA
SUMMARY OF PROPOSED RELIEF FACILITIES PHASING

Line No.	Description	Phase
45-47	Caracas Street Sec. Intercepting Sewer (Into: Division 4F14, McBerry Street Force Main)	1980-85
55-62	24th Street Sec. Intercepting Sewer (Into: Division 4G8, Buffalo Avenue Force Main)	1980-85
74-78	Bayshore Intercepting Sewer (Into: Interbay Intercepting Sewer)	1980-2000
177	River Heights Intercepting Sewer (Into: Pump Station At Kirby Street & Hills River)	1980-2000
	STRUCTURAL RELIEF FACILITIES	
	West River Intercepting Sewer	1985-1990
79-81	Ballast Point Secondary Intercepting Sewer	1990-2000
173-174	Drew Field Secondary Intercepting Sewer	1990-2000
	Spruce Street Secondary Intercepting Sewer	1990-2000
274-292	Louisiana - Chelsea Secondary Intercepting Sewer	1990-2000
75-76	Bayshore Intercepting Sewer (South)	1990-2000
	Palmira Secondary Intercepting Sewer	1990-2000
69-74	Bayshore Intercepting Sewer (North)	1990-2000
411	Main Outlet Intercepting Sewer	1990-2000
4-7	Palmetto Secondary Intercepting Sewer	1990-2000
177	River Heights Intercepting Sewer	1990-2000

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[1] Refers to pipeline section identification in Study Memorandum No. 6 of the 201 Facility Plan.

and transmission facilities necessary to improve the existing Brandon Sewer System and transport flows to the study area treatment plant. Phase I projects will phase out seven existing package treatment plants.

The first priority of Phase I is to relieve the Brandon Sewer System and phase out the troublesome Brandon East Treatment Plant. Completion of these projects will provide relief to the remainder of the Brandon Sewer System and remove some flow from the City of Tampa's East Tampa Industrial Park Secondary Intercepting System.

The second priority of Phase I is to divert flow from the central portion of Brandon to the new study area treatment plant. This portion includes the majority of the residential and commercial areas of the study area. Completion of these projects will provide further relief to the Brandon System and further reduce flow into the Tampa System.

The third priority of Phase I is to divert flows from the Faulkenburg Road area to the regional treatment plant. This area is primarily industrial. Actual timing of this work will be based upon continued review of the actual flow from the area and available capacity in Tampa's system.

Projects completed during Phase II will serve mostly residential areas and includes the extension of the Faulkenburg Road system, the North Parsons Road system and the East Bloomingdale Avenue system. Completion of these projects will phase out five existing package treatment plants.

4. RIVERVIEW-GIBSONTON STUDY AREA

Wastewater Treatment and Disposal

The preferred alternative for treatment and disposal of wastewater in the Riverview-Gibsonton study area is alternative RG7, which involves pumping to the proposed South County facilities for treatment and disposal by spray irrigation. This alternative is the most cost-effective, provides needed treatment capacity and provides for recycling of wastewater.

The preferred alternative requires the construction of a transmission system to transport wastewater to the proposed Apollo Beach Pumping Station from which it will be pumped to the South County Regional Wastewater Treatment Plant. The South County Regional Plant will provide secondary treatment of the wastewater and the effluent will be disposed by spray irrigation. Site specific studies are currently in progress to define spray irrigation sites in the South County Area. It will be necessary to expand the scope of these site specific studies to include the additional flow projected from the Riverview-Gibsonton Study Area.

Construction of the Apollo Beach Pumping Station and the force main to the regional treatment plant are scheduled for completion in 1986.

Wastewater Collection and Transmission

The preferred alternative for the collection and transmission of wastewater in the Riverview-Gibsonton study area is that which provides for plan approval now only to phases scheduled for construction by 1990. Planning approval on additional phases will be delayed until results of the 1990 census are available and a need can be justified.

Only one phase of projects is included in the preferred alternative. These projects are scheduled during the period 1985 - 1990 to coincide with the completion of the Apollo Beach pumping station and force main.

These projects will provide sewer service to areas which are already substantially developed and provide for phasing out as many as 17 existing package treatment plants. The first priority is to construct the transmission system to the Apollo Beach pumping station and the intercepting systems required to serve the Gibsonton area between the Alafia River and Bullfrog Creek plus the developed area north of the Alafia River near U.S. 41.

The second priority is to complete the transmission system along U.S. 41, to complete the projects necessary to provide service to the Riverview area, to phase out the Progress Village Treatment Plant, and to construct pumping station and force main systems to serve the Port Sutton and Adamsville industrial areas.

CHAPTER IV - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

PART A: INTRODUCTION

This chapter summarizes the existing natural and man-made environment of the study area, discusses the environmental impacts of the alternatives and proposes possible measures to mitigate these impacts. The purpose of the environmental setting summary is the establishment of existing baseline conditions in the area. A more detailed description of existing baseline conditions is contained in Technical Reference Document, Volume I, Existing Environment, which is a part of this EIS. The impacts of the various alternatives, including the No-Federal-Action alternative, are gauged against these existing conditions. The discussions of impacts and proposed mitigative measures are structured according to environmental category (i.e., odor, surface water resources, resource use, water supply, etc.). This organization is intended to facilitate the comparison of the alternatives. A more detailed description of the impacts and mitigative measures is contained in Technical Reference Document, Volume II, Alternatives Development and Evaluation.

PART B: EXISTING NATURAL ENVIRONMENT

1. AIR QUALITY

The Hillsborough County Environmental Protection Commission (HCEPC) routinely monitors air quality in Hillsborough County. Data for the period 1976-1978 indicate that suspended particulate and sulfur dioxide levels outside of the Tampa urban area were generally well below federal and state ambient air quality standards. For the same period, ozone levels exceeded federal and state standards. In general, the Tampa Service Area is classified as a nonattainment area (not attaining the National Ambient Air Quality Standards) for particulate matter. All of Hillsborough County is considered a nonattainment area for ozone.

2. ODOR

Although the HCEPC receives odor complaints from time-to-time, there are no pervasive odor problems throughout the county planning area. Therefore, there are no definite avoidance areas where the placement of odor producing facilities associated with the 201 project would add to an already serious problem.

3. NOISE

The highest noise levels within the Planning Area generally occur within and near the TSA. A "City Noise Index" was developed for the county based on a residential noise survey performed in June, 1978 by the HCEPC and measurements performed within the noise pattern of Tampa International Airport. The average day/night sound level, L_{da}, for all 22 sites was 58 dBA. Individual site measurements of L_{dn} ranged from 42dBA to 74dBA. The relatively high City Noise Index is largely attributable to the influence of civilian and military jet aircraft. A L_{dn} of 50 to 55 dBA is considered more appropriate for the Planning Area, especially for the less populated eastern half.

4. TOPOGRAPHY

The Planning Area is located within the Gulf Coastal Plain Physiographic Province which is generally characterized by relatively gentle topography and limited physiographic variations. The Gulf Coastal Plain is divided into two major physiographic regions within the Planning Area. These regions are the Gulf Coastal Lowlands and the Central Highlands (Figure IV-1), (Wright, 1974).

The Gulf Coastal Lowland is relatively flat, ranging in elevation from mean sea level (MSL) to about 85 feet MSL. The majority of the lowland sections are somewhat poorly drained and characterized by swamps. The northwestern portion of the TSA is dotted by numerous lakes, the result of karst topography.

The Central Highland is topographically higher than the Gulf Coastal Lowlands, ranging in elevation from 340 feet MSL to over 100 feet MSL at the eastern Hillsborough County boundary. The east, south and central sections of the Planning Area are gently rolling to flat. The area is a moderately well-drained, dissected upland except in an area near Brandon where a somewhat subdued karstic topography and internal drainage system exists.

The topography of the Planning Area is shown in Figure IV-2. Slopes greater than 10 percent are uncommon and generally occur along small portions of the Hillsborough River and Alafia River.

5. GEOLOGY

The Planning Area is underlain by more than 8000 feet of Cenozoic sedimentary material which rests on crystalline basement. The Cenozoic sedimentary material consists primarily of limestone dolostone, clay and sand (Menke, et.al., 1961). Eocene and younger units comprise the major geologic resources of the Planning Area.

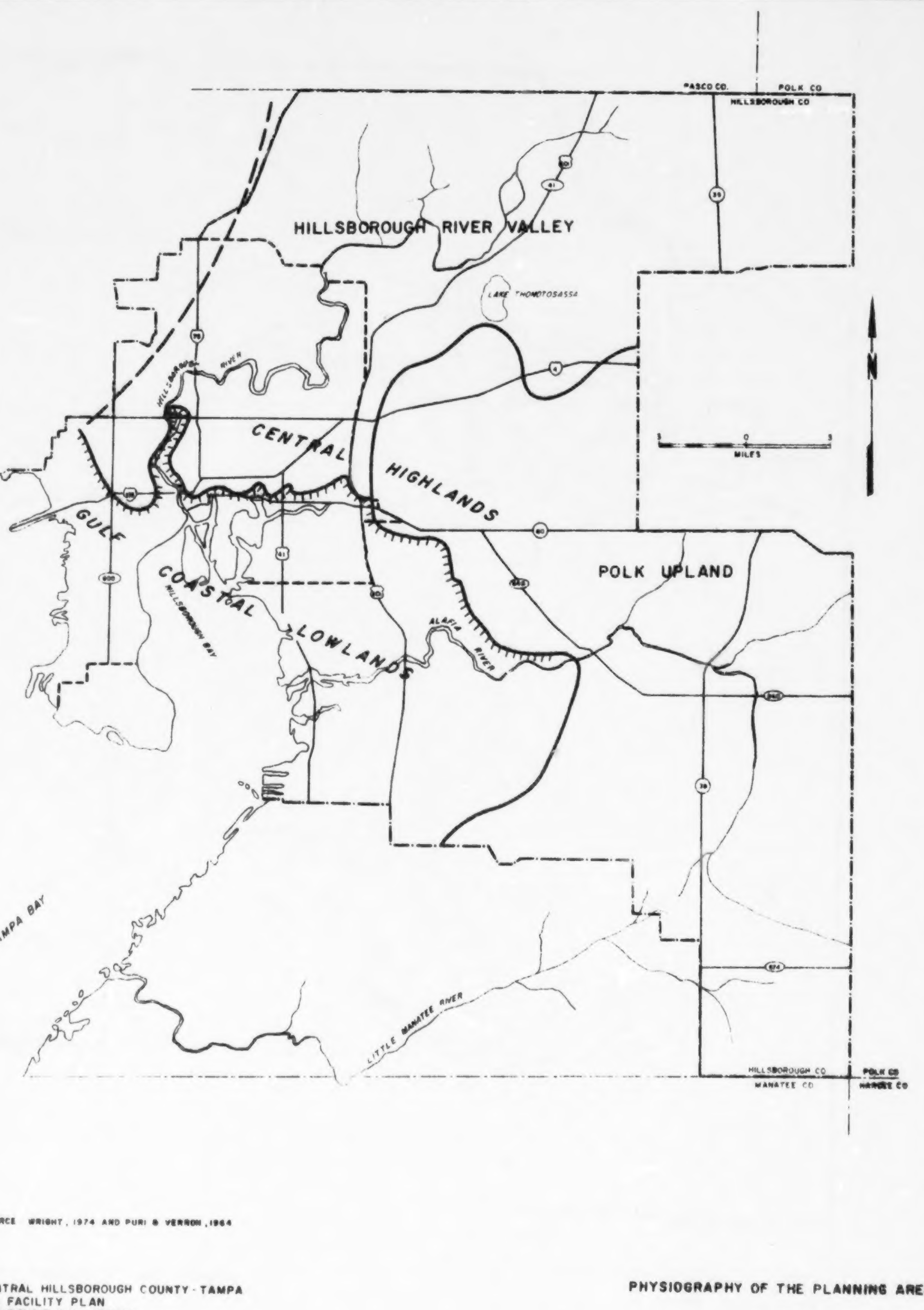
A summary of the major geologic units and their hydrogeologic significance is presented in Table IV-1. A surface blanket of porous sands exists over most of the Planning Area. These sands range in depth from 25 feet in river valleys to more than 50 feet in topographically high areas. These surface sands comprise the water table aquifer.

Fine-grained, low permeability sediments, principally of the Hawthorn formation, underlie the surface sands. These fine-grained sediments serve to confine the underlying principal artesian aquifer. The confining bed thickness is greater in the southeast portion of the Planning Area, being thinnest in the Hillsborough River Valley.

The Hawthorn formation is underlain by the Tampa and Suwannee limestones. The two formations are not easily distinguished stratigraphically and are often considered as a somewhat discrete hydrogeologic unit. The Tampa-Suwannee limestone is the uppermost unit of the thick sequence of carbonate rocks which form the principal artesian aquifer. The unit crops out at places within the county, but commonly is immediately overlain by the younger Hawthorn formation or by undifferentiated sands and clays (Menke, et.al., 1961).

The Suwannee limestone formation is underlain by the Ocala Group which consists of the Inglis, Williston and Crystal River formations. These formations are dominantly limestone of moderate to low permeability and are generally not utilized as a water resource in the Planning Area. The upper part of the Ocala

IV-3


PASCO CO.
POLK CO
HILLSBOROUGH CO
HILLSBOROUGH RIVER VALLEY
LAKE THONOTOSASSA
HILLSBOROUGH RIVER
CENTRAL HIGHLANDS
N
3 0 3
MILES
GULF COASTAL LOWLANDS
HILLSBOROUGH BAY
POLK UPLAND
ALAFIA RIVER
TAMPA BAY
LITTLE MANATEE RIVER
HILLSBOROUGH CO
POLK CO
MANATEE CO
HARDEE CO
41
39
4
60
41
600

SOURCE WRIGHT, 1974 AND PURI & VERNON, 1964

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201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

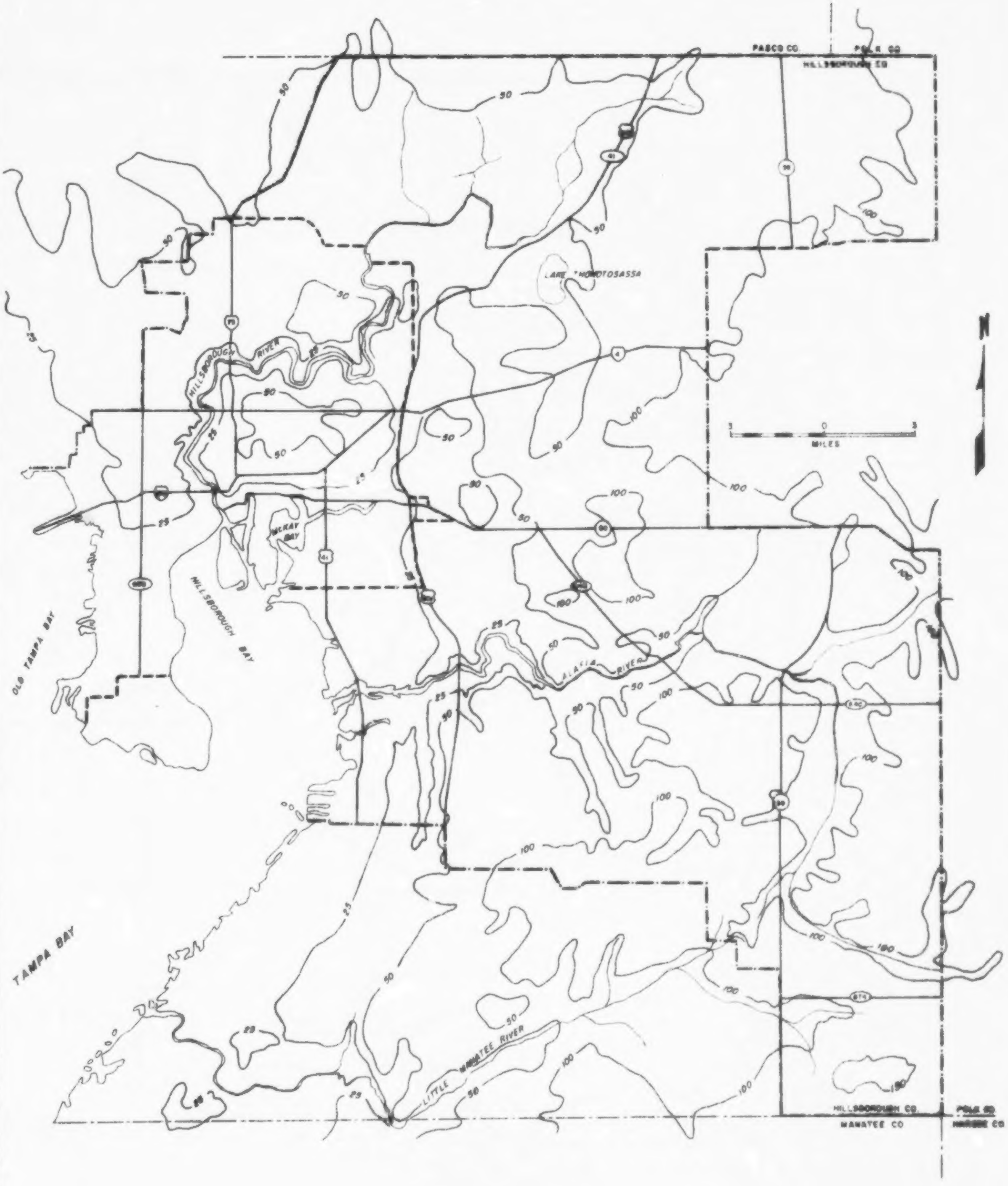
PHYSIOGRAPHY OF THE PLANNING AREA

DAMES & MOORE

FIGURE IV-1

76600026 (5/79)

IV-5


PASCO CO.
POLK CO.
HILLSBOROUGH CO.
LAKE THONOTOSASSA
HILLSBOROUGH RIVER
McKAY BAY
HILLSBOROUGH BAY
OLD TAMPA BAY
TAMPA BAY
ALAFIA RIVER
LITTLE MANATEE RIVER
HILLSBOROUGH CO.
POLK CO.
MANATEE CO
HARDEE CO
N
3
0
3
MILES
25
50
100

SOURCE: U.S. GEOLOGICAL SURVEY 1:250,000 SCALE - TAMPA, 1956 - 72
AND PLANT CITY, 1957 - 72

CENTRAL HILLSBOROUGH COUNTY - TAMPA
201 FACILITY PLAN
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TOPOGRAPHY OF PLANNING AREA

DAMES & MOORE

FIGURE IV - 2

Group is thought to restrict, to some degree, vertical ground water movement between the more permeable units which lie above and below.

The Ocala Group is underlain by the Avon Park and Lake City limestones. The Lake City and Avon Park limestones are a thick sequence of carbonate sediments, consisting of limestones and dolomitic limestone. Gypsum and other evaporite minerals may occur in the deeper portions of the formations and indicate the presence of highly mineralized (non-potable) connate waters. The depth of the evaporite occurrence varies from -900 feet MSL in the north to -1400 MSL in the south part of Hillsborough County (USGS unpublished data, 1979). Thick zones of dolomitic limestone often occur within the Avon Park limestone and comprise the major water-bearing zones in these Eocene limestones. These massive, crystalline dolomitic zones are brittle in nature and are highly fractured.

The Lake City limestone is underlain by the Oldsmar limestone which is deeply buried and is generally not penetrated by wells in the Planning Area. Owing to its depth and limited value as a ground water resource, comparatively little is known about the Oldsmar limestone.

Karst or sinkhole topography occurs over portions of the Planning Area. In general, karst features in the Tampa Bay area occur along a northwest-southeast trend. Although it is thought that the presence of solution features is related to the regional geologic structure, no clear pattern of development has been discovered. As a result, accurate prediction of specific areas of potential collapse is difficult. Figure IV-3 indicates general areas where sinkholes and subsurface cavities occur. In these zones, hydrologic, geologic and soil conditions are potentially favorable for sinkhole development.

In addition to the potential for property damage from sinkhole formation, there is increased possibility of ground water contamination in karstic terrain. Sinkholes provide local avenues for the recharge of the artesian aquifer from surface water and ground water from the water table aquifers. Examples of such occurrences are the "Blue Sink" area which captures the flow of Curiosity Creek and the Brandon area where recharge waters enter the artesian aquifer through the overlying sediments.

6. SOILS

The soils in the Planning Area have been mapped by the U.S. Department of Agriculture, Soil Conservation Service. Eleven soil associations occur within the study area as shown in Figure IV-4. Limitations or suitability of soils for particular land use activities are shown in Table IV-2.

Soil associations within the Planning Area generally have severe limitations for on-lot disposal systems (Figure IV-5) especially in the areas of projected development. However, many of the soils are suitable for slow-rate land application treatment methods, such as spray irrigation. These soils are shown in Figure IV-6.

7. SURFACE WATER RESOURCES

The major surface water bodies within the Planning Area are the Hillsborough River, the Alafia River and portions of the Tampa Bay System. Lesser water bodies impacted by the 201 planning process include Bullfrog Creek and Delaney Creek.

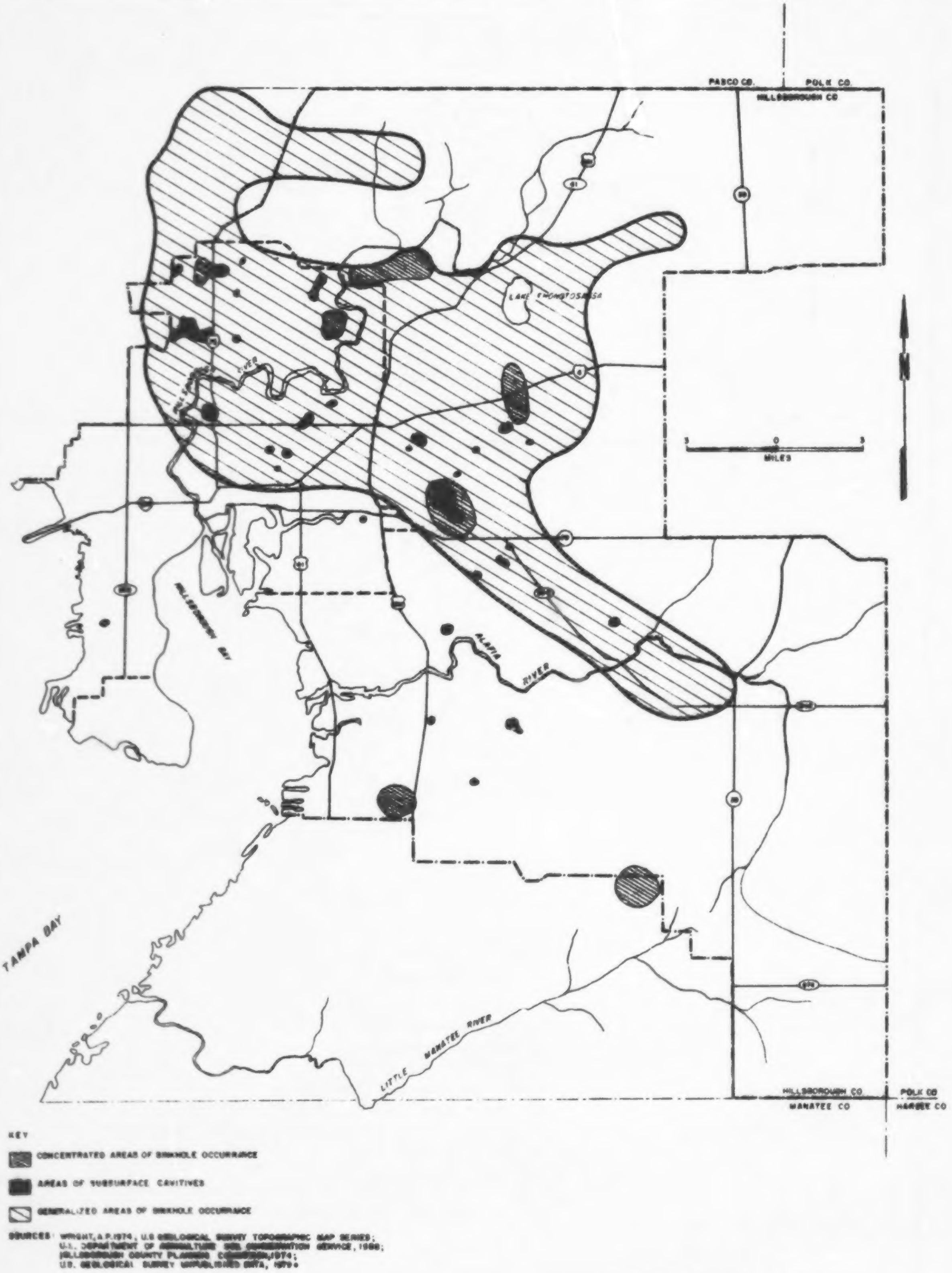
A report prepared in 1978 assessed the water quality of the Tampa Bay Region (TBRPC, 1978a) of which the Planning Area is a portion. This report concluded that

TABLE IV-1

SUMMARY OF CENOZOIC FORMATIONS

Era	Series	Formation	Thickness	Lithology	Water Supply	Aquifer
Cenozoic	Pleistocene and Holocene (Recent) Pliocene	Undifferentiated	0-150	Sand, clay, and marl.	Sand yields up to 200 gpm in some areas and generally 5 to 10 gpm to driven wells less than 40 feet deep. Clay and marl do not yield usable quantities of water to wells.	Water table aquifer
	Miocene	Hawthorn formation	0-250	Clay, sand, and limestone. Limestone, near bottom of formation, is white to gray, soft, sandy, and porous.	Limestone member yields up to 200 gpm.	Principal confining bed/secondary artesian aquifer
		Tampa limestone	80-400	White, cream, and gray, hard to soft, sandy limestone. Many molds of pelecypods and gastropods.	Yields up to 1,000 gpm. Supplies most domestic and commercial wells in county.	Principal artesian
	Oligocene	Suwannee limestone		White, yellow, and light brown, soft to hard, dense, fine-grained limestone with chert lenses to 25 feet thick.		
	Eocene Ocala group[1]	Crystal River formation (Puri, 1957) Williston formation (Puri, 1957 Inglis limestone	90-300	Yellow-gray and brown soft, almost pure limestone. Mostly foraminiferal coquinas in pasty limestone matrix.	Rarely used for water supply because of low transmissibility.	
		Avon Park limestone	200+	Soft, chalky, cream to brown limestone containing beds of foraminiferal coquina and zones of brown to dark brown, hard, crystalline dolomitic limestone. Locally contains some gypsum.	Principal source of supply for wells yielding more than 500 gpm. Yield exceeds 5,000 gpm in some wells.	
		Lake City limestone	500			
		Oldsmar limestone	900	Fragmental dolomitic limestone with lenses of chert, thin shale beds and some gypsum.	Not used for water supplies but is potential source of fresh water in north-central and northeastern part of county.	

SOURCE : MENKE ET AL., 1961


PASCO CO.
POLK CO.
HILLSBOROUGH CO
LAKE THONOTOSASSA
HILLSBOROUGH RIVER
HILLSBOROUGH BAY
ALAFIA RIVER
TAMPA BAY
LITTLE MANATEE RIVER
N
5 0 5
MILES
HILLSBOROUGH CO.
POLK CO
MANATEE CO
HARDEE CO
KEY
CONCENTRATED AREAS OF SINKHOLE OCCURRANCE
AREAS OF SUBSURFACE CAVITIVES
GENERALIZED AREAS OF SINKHOLE OCCURRANCE

SOURCES: WRIGHT, A.P. 1974, U.S. GEOLOGICAL SURVEY TOPOGRAPHIC MAP SERIES;
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE, 1958;
HILLSBOROUGH COUNTY PLANNING COMMISSION, 1974;
U.S. GEOLOGICAL SURVEY UNPUBLISHED DATA, 1979.

SINKHOLE PRONE AREAS

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ENVIRONMENTAL REPORT
EPA No. C120634010

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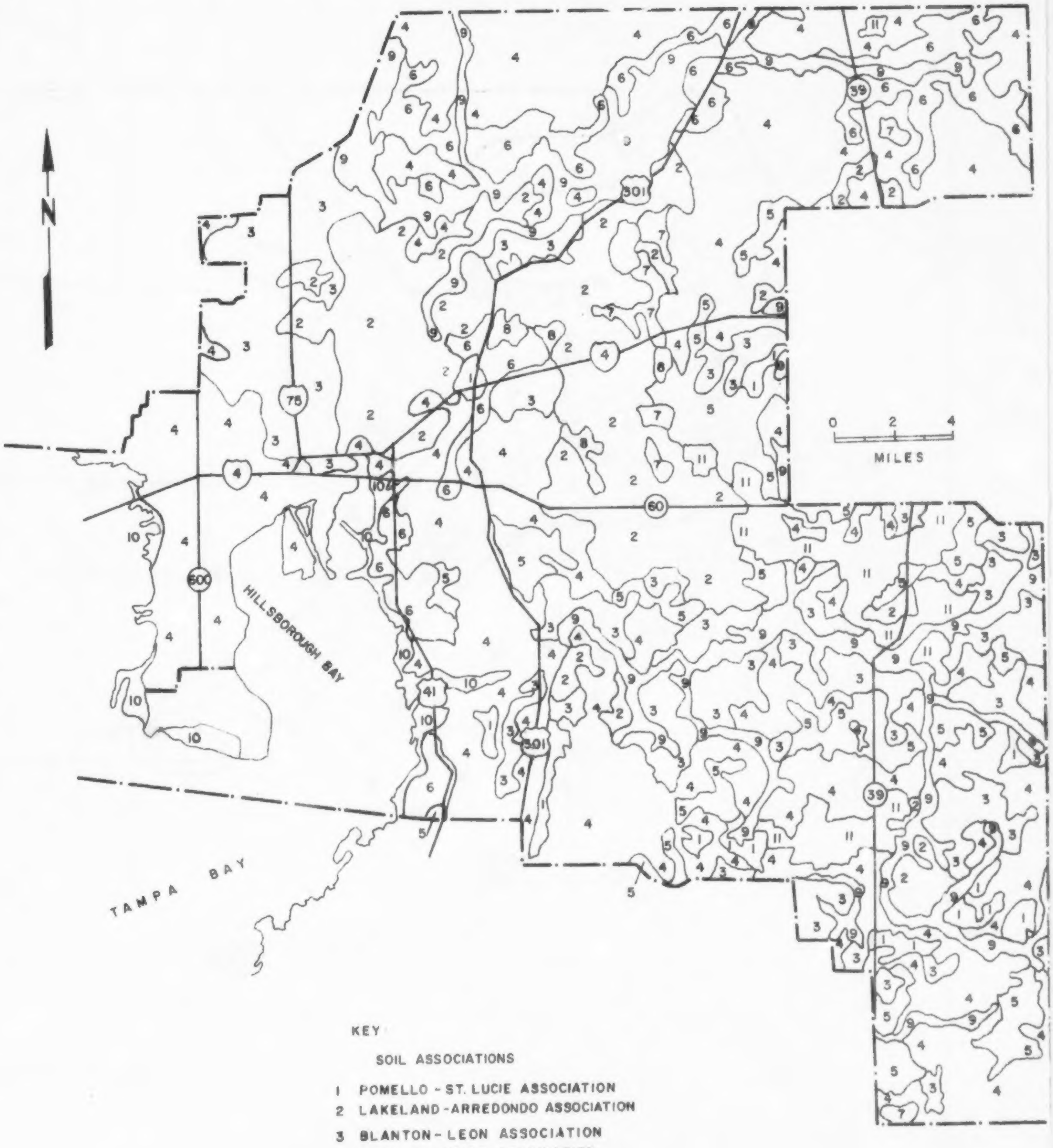
FIGURE IV-3



KEY

SOIL ASSOCIATIONS

1 POMELLO - ST. LUCIE ASSOCIATION
2 LAKELAND-ARREDONDO ASSOCIATION
3 BLANTON-LEON ASSOCIATION
4 LEON-PLUMMER ASSOCIATION
5 ONA-SCRANTON-LEON ASSOCIATION
6 RUSKIN-SUNNILAND-BRADENTON ASSOCIATION
7 RUTLEGE-FRESH WATER SWAMP-PLUMMER ASSOCIATION
8 BRIGHTON-TERRA CECIA ASSOCIATION
9 FRESH WATER SWAMP ASSOCIATION
10 SALT WATER SWAMPS AND MARSHES ASSOCIATION
11 MINE PITS AND DUMPS ASSOCIATION

SOURCE: U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE, 1969.

GENERAL SOIL ASSOCIATIONS IN THE PLANNING AREA

CENTRAL HILLSBOROUGH COUNTY-TAMPA
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FIGURE IV - 4

0765601026(9/79)

TABLE II-1

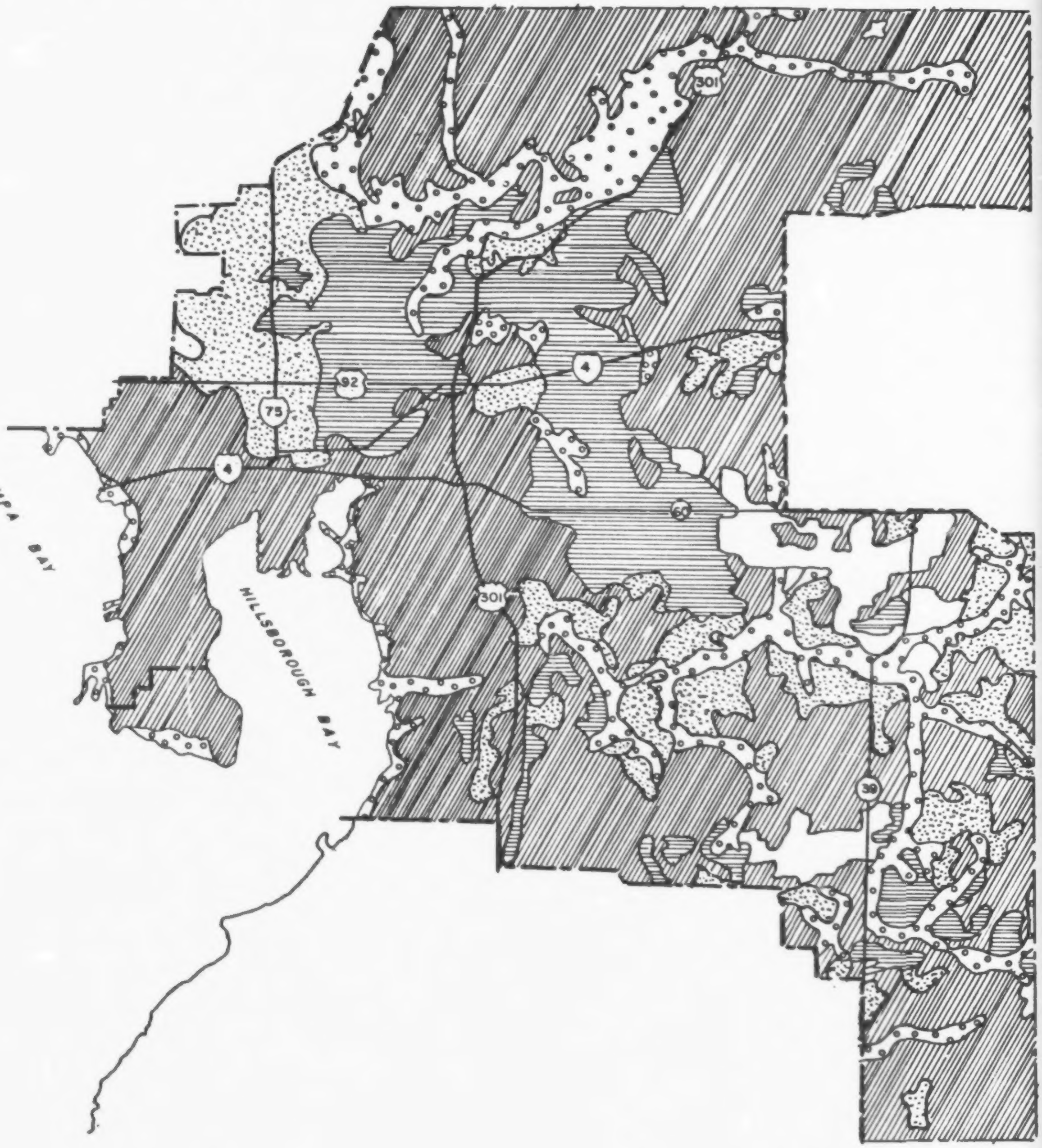
CENTRAL HILLSBOROUGH COUNTY - TAMPA 201 PLANNING AREA
ALTERNATIVES DEVELOPMENT

Alternative Designation	Million Gallons Per Day		Treatment In Study Area	Disposal Method In Study Area
	Amount To Tampa	Amount To Study Area		
DELTONA STUDY AREA				
*D1	--	1.39	Secondary	Wetlands Disposal
D2	--	1.39	Secondary & Filtration	Deep Well Injection
*D3	1.39	--	--	--
THONOTOSASSA STUDY AREA				
*T1	--	0.55	Secondary	Spray Irrigation
T2	--	0.55	Secondary & Filtration	Deep Well Injection
*T3	0.55	--	--	--
BRANDON STUDY AREA				
*B1	--	9.73	Secondary & Nitrification	To Alafia River
B2	--	9.73	Advanced Wastewater Treatment	To Alafia River
*B3	--	9.73	Secondary	Spray Irrigation
B4	--	9.73	Secondary & Filtration	Deep Well Injection
B5	5.60	4.13	Secondary & Nitrification	To Alafia River
B6	5.60	4.13	Advanced Wastewater Treatment	To Alafia River
B7	5.60	4.13	Secondary	Spray Irrigation
B8	5.60	4.13	Secondary & Filtration	Deep Well Injection
B9	7.91	1.82	Secondary & Nitrification	To Alafia River
B10	7.91	1.82	Advanced Wastewater Treatment	To Alafia River
B11	7.91	1.82	Secondary	Spray Irrigation
B12	7.91	1.82	Secondary & Filtration	Deep Well Injection
*B13	9.73	--	--	--
RIVERVIEW-GIBSONTON STUDY AREA				
*RG1	--	5.85	Secondary & Nitrification	To Alafia River
RG2	-	5.85	Advanced Wastewater Treatment	To Alafia River
RG3	--	5.85	Advanced Wastewater Treatment	To Hillsborough Bay
*RG4	--	5.85	Secondary	Spray Irrigation
RG5	--	5.85	Secondary & Filtration	Deep Well Injection
*RG6	5.85	--	--	--
*RG7	--	--	5.85 MGD To South County 201 Planning Area	--
RG8	2.29	3.56	Secondary & Nitrification	To Alafia River
RG9	2.29	3.56	Advanced Wastewater Treatment	To Alafia River
RG10	2.29	3.56	Advanced Wastewater Treatment	To Hillsborough Bay
RG11	2.29	3.56	Secondary	Spray Irrigation
RG12	2.29	3.56	Secondary & Filtration	Deep Well Injection
RG13	2.29	--	3.56 MGD To South County 201 Planning Area	--

*Selected for more detailed analysis.

Reproduced from best available copy.

iv-10


OLD TAMPA BAY
HILLSBOROUGH BAY
301
92
75
4
60
301
39

CENTRAL HILLSBOROUGH COUNTY - TAMPA -
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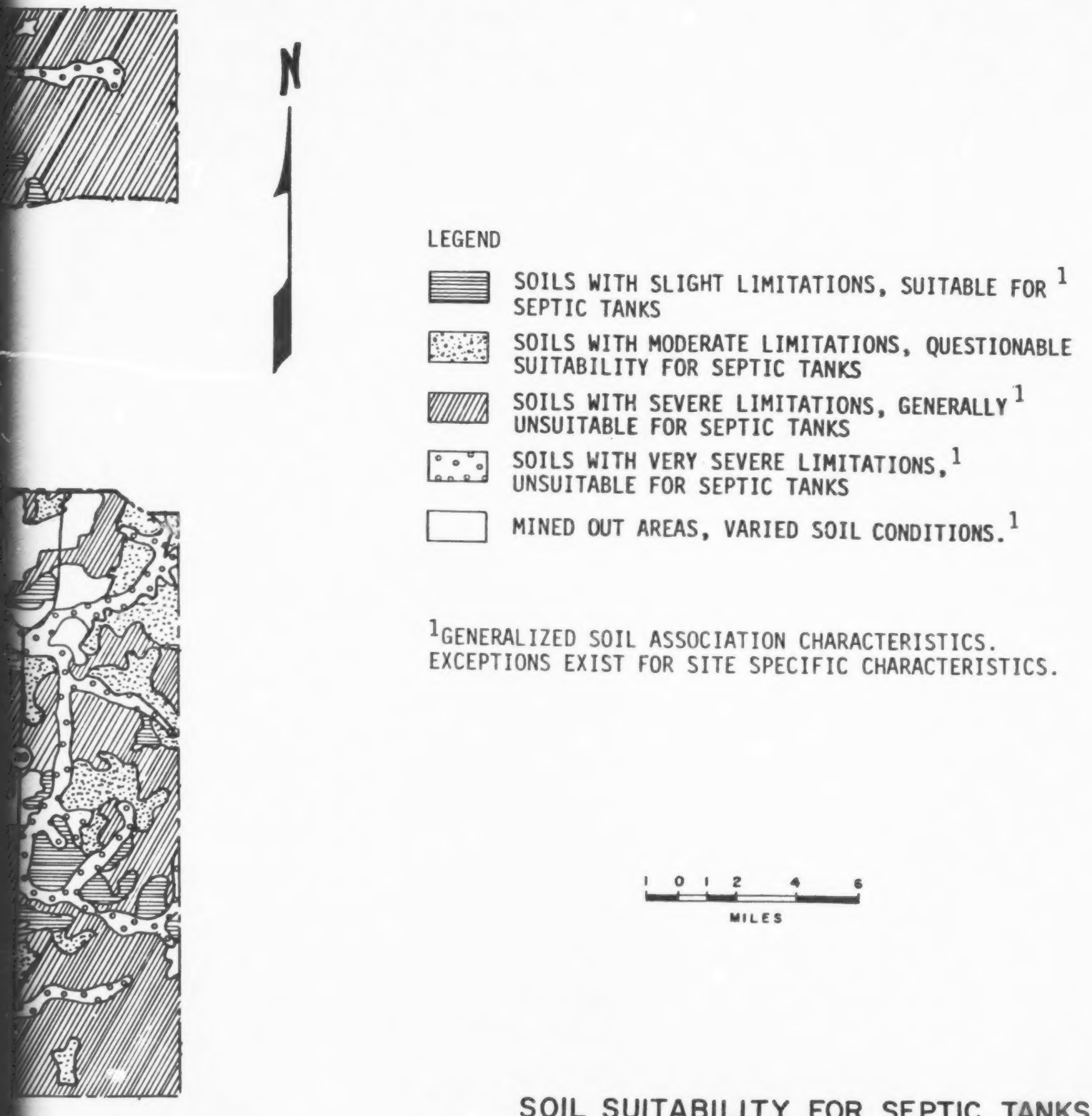
SOURCE: U.S. DEPARTMENT OF AGRICULTURE SOIL CO
SERVICE, 1969 AND HILLSBOROUGH COUNTY
COMMISSION, 1974

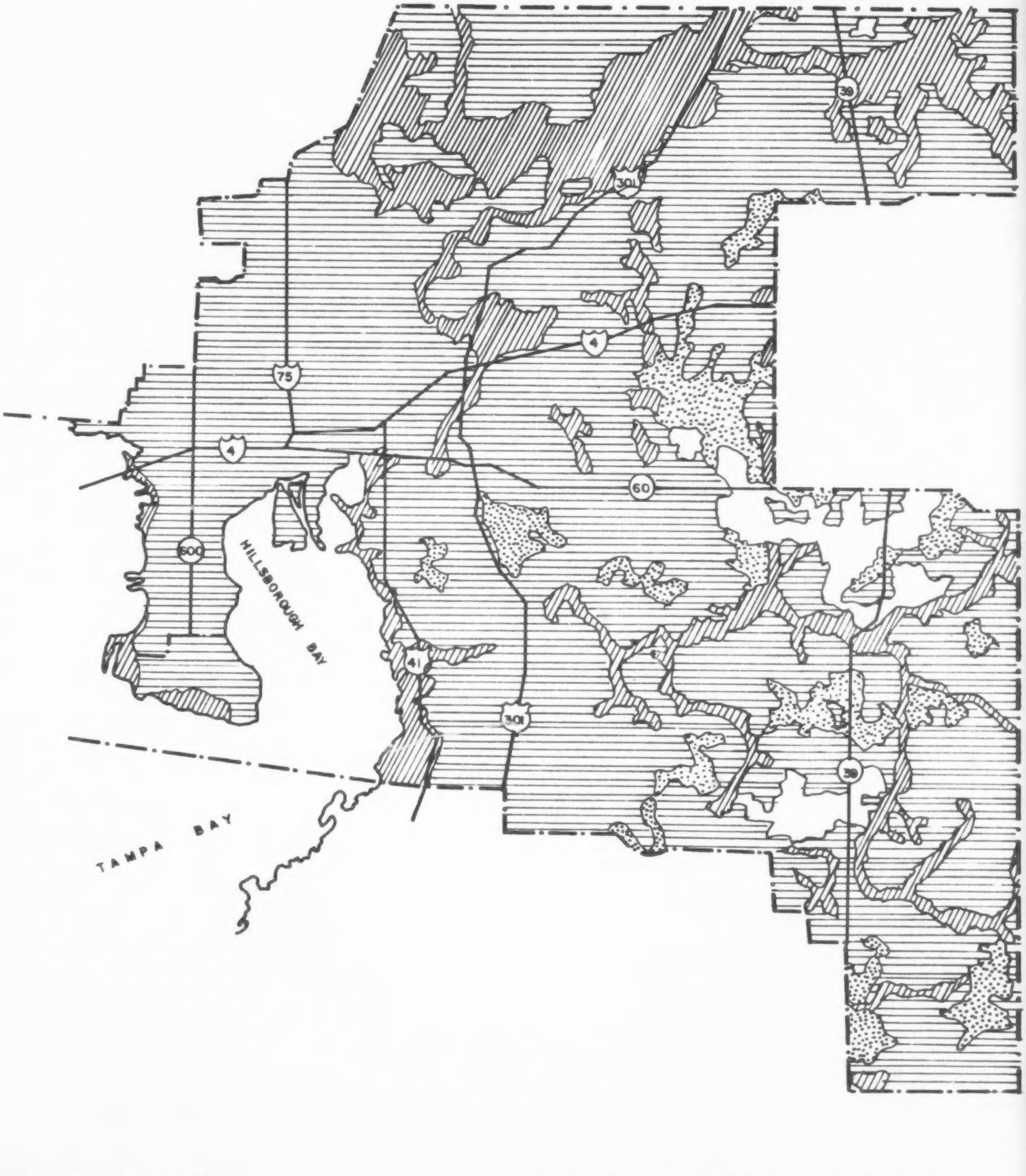

N
LEGEND
▤ SOILS WITH SLIGHT LIMITATIONS, SUITABLE FOR SEPTIC TANKS [1]
▒ SOILS WITH MODERATE LIMITATIONS, QUESTIONABLE SUITABILITY FOR SEPTIC TANKS
▨ SOILS WITH SEVERE LIMITATIONS, GENERALLY UNSUITABLE FOR SEPTIC TANKS [1]
⁘ SOILS WITH VERY SEVERE LIMITATIONS, UNSUITABLE FOR SEPTIC TANKS [1]
☐ MINED OUT AREAS, VARIED SOIL CONDITIONS. [1]
[1] GENERALIZED SOIL ASSOCIATION CHARACTERISTICS. EXCEPTIONS EXIST FOR SITE SPECIFIC CHARACTERISTICS.
1 0 1 2 4 6
MILES

SOIL SUITABILITY FOR SEPTIC TANKS
IN THE PLANNING AREA

RICULTURE SOIL CONSERVATION
BOROUGH COUNTY PLANNING

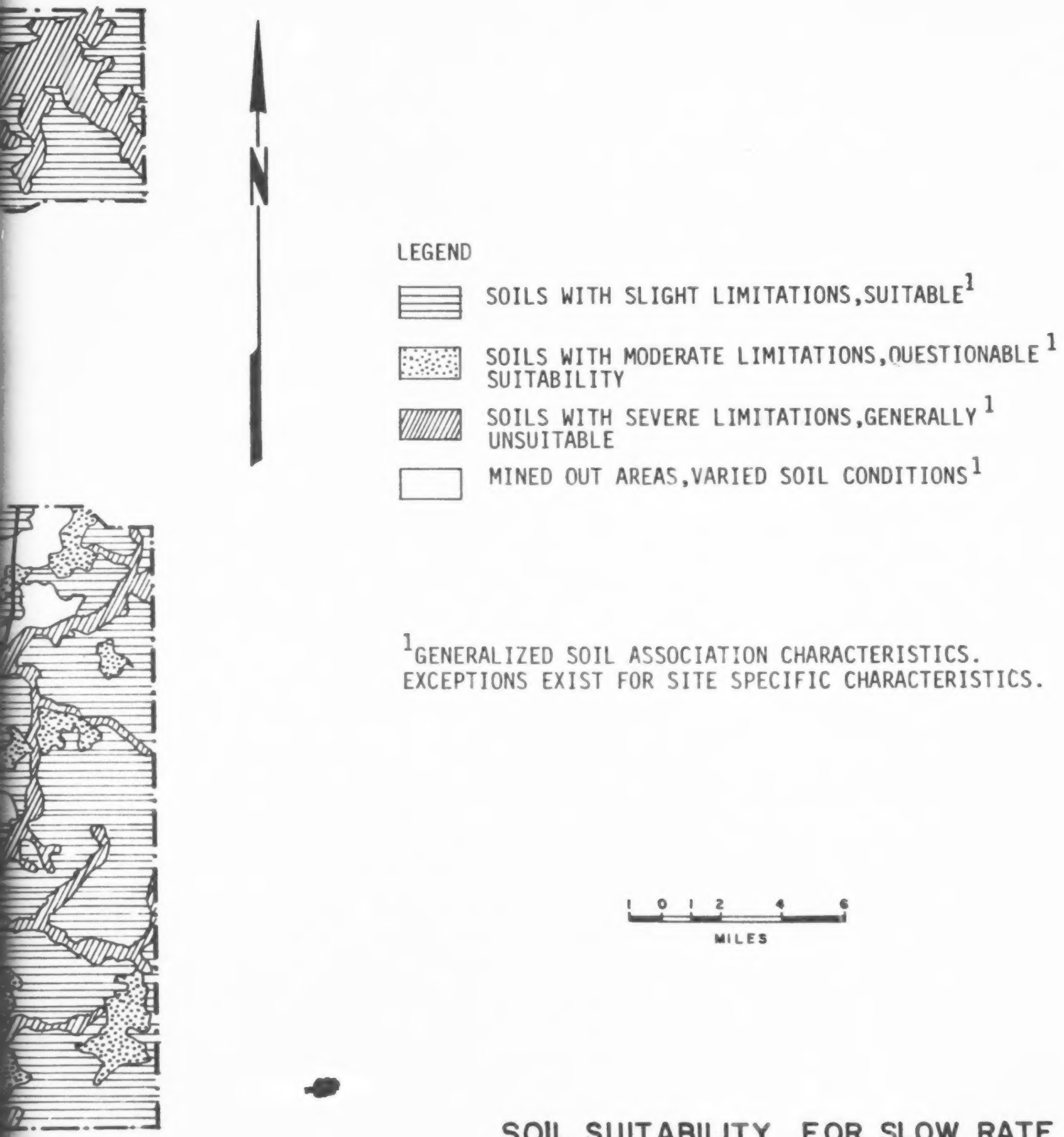
DAMES & MOORE

FIGURE IV-5


39
301
4
75
4
60
600
HILLSBOROUGH BAY
41
301
39
TAMPA BAY

CENTRAL HILLSBOROUGH COUNTY - TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

SOURCE: U.S. DEPARTMENT OF AGRICULTURE SOIL CON
SERVICE, 1969 AND PERSONAL COMMUNICATIO
J.W. MILLER (SCS), 1979


N
LEGEND
SOILS WITH SLIGHT LIMITATIONS, SUITABLE[1]
SOILS WITH MODERATE LIMITATIONS, QUESTIONABLE SUITABILITY[1]
SOILS WITH SEVERE LIMITATIONS, GENERALLY UNSUITABLE[1]
MINED OUT AREAS, VARIED SOIL CONDITIONS[1]
1 0 1 2 4 6
MILES

[1] GENERALIZED SOIL ASSOCIATION CHARACTERISTICS. EXCEPTIONS EXIST FOR SITE SPECIFIC CHARACTERISTICS.

SOIL SUITABILITY FOR SLOW RATE LAND TREATMENT IN THE PLANNING AREA

CULTURE SOIL CONSERVATION
AL COMMUNICATION,

DAMES & MOORE

FIGURE IV-6

surface water quality was generally acceptable. Excessive nutrient concentrations attributed primarily to non-point sources of water pollution is the Region's most widespread problem.

Water quality characteristics of most of the surface waters in the Planning Area are presented in Table IV-3. This table presents maximum, minimum and average concentrations of select water quality parameters for the period January, 1970 to December, 1976. Locations of the stream segments presented in the table are shown on Figure IV-7. These data were compiled by Texas Instruments for the Central Florida Phosphate Industry Areawide Impact Assessment Program from water quality data collected by the Florida Department of Environmental Regulation and the United States Geological Survey.

The State of Florida Administrative Code classifies the surface waters of the Planning Area according to the best intended use of those waters. The surface waters in the Planning Area are classified as shown in Figure IV-8. Class I-A waters are intended for use as water supply for drinking or food processing. Class II waters are intended for use as shellfish propagation and harvesting. Class III waters are intended for recreational uses and the propagation of fish and wildlife. Water quality requirements for select classes are presented in Table IV-4. In addition, the Hillsborough River within the boundaries of the Hillsborough River State Park is considered an "outstanding Florida water".

Flood prone areas in the Planning Area are shown in Figure IV-9. The areas shown are those that would flood during the 100-year flood. North of the incorporated areas of Tampa and Temple Terrace, the floodplain of the Hillsborough River is broad, heavily vegetated and contains little development. Within the incorporated areas of Tampa, the floodplains are relatively narrow and, with several small exceptions, contain little development. The floodplains along the downstream portion of the Alafia River are relatively narrow and contain little development. The upstream floodplains are generally broad, heavily vegetated and also contain little development.

The following sections summarize the general characteristics of the major surface water bodies within the Planning Area. More detailed descriptions are presented in Technical Reference Document, Volume I, Existing Environment.

Tampa/Hillsborough Bay System

The Tampa/Hillsborough Bay System is composed of adjoining estuaries which include Boca Ciega Bay, Tampa Bay, Old Tampa Bay, Hillsborough Bay, McKay Bay and Terra Ceia Bay. The study area includes portions of upper Tampa Bay, the eastern half of Old Tampa Bay and all of Hillsborough and McKay Bays.

Tampa Bay, Hillsborough Bay and McKay Bay have surface areas of approximately 350 square miles, 35 square miles and 1.5 square miles, respectively. Average depths are on the order of 10 to 11 feet with the exception of McKay Bay. The deepest natural parts of McKay Bay are only five feet but dredging of the Tampa Bypass Canal and borrow areas have left areas as deep as 15 feet.

The dominant flushing mechanism in the Tampa/Hillsborough Bay System is tidal action. However, flushing of the system is poor due to the small range in tidal levels (2.3 feet in Tampa Bay and 2.5 feet in Hillsborough Bay). A single suspended particle released in upper Old Tampa Bay may take from 5 to 20 months to leave the bay. A 90 percent reduction in concentrations of a dissolved substance in Tampa Bay requires approximately 180 days (Ross, 1978).

CHARACTERISTIC WATER QUA

Designation on Map		Alkalinity (mg/ℓ CaCO$_3$)	BOD$_5$ (mg/ℓ)	Color (Pt. Co unit)	Conductivity (mho/cm)	Dissolved Oxygen (mg/ℓ)	Fluorid (mg/ℓ)
A.1	Max	90	–	–	–	6.6	4.6
	Min	12	–	–	–	6.6	0.5
	Avg	47	–	–	–	6.6#	2.1
A.2	Max	158	2.6	30	560	8.0	44.0
	Min	14	2.6	30	560	8.0	0.5
	Avg	76	2.6#	30#	560#	8.0#	3.8
A.3	Max	57	1.3	60	1,530	10.4	22.0
	Min	2	0.0	10	221	2.2	1.9
	Avg	34	0.7	32	833	7.0	10.7
A.4	Max	120	8.9	110	393	11.0	0.8
	Min	4	0.8	14	152	1.1	0.3
	Avg	48	2.3	34*	222	6.2	0.6
A.5	Max	258	–	–	–	5.4	44.0
	Min	16	–	–	–	1.4	0.3
	Avg	64	–	–	–	3.0#	6.2
A.6	Max	148	1.3	160	2,450	10.0	6.6
	Min	2	0.4	2	171	0.8	0.5
	Avg	52	1.0	63	382	6.5	3.3
A.7	Max	680	3.7	130	1,140	10.2	55.0
	Min	0	0.1	10	210	1.8	0.3
	Avg	57	1.1	49	599	7.0	5.8
A.8	Max	120	8.5	114	1,280	12.1	14.4
	Min	20	0.2	5	152	3.9	0.2
	Avg	46*	2.6*	39*	566*	6.7*	5.6*
A.9	Max	310	11.1	43	45,900	12.8	12.0
	Min	20	0.0	5	14,000	0.3	0.7
	Avg	76	2.6	15	33,049	6.1	4.6
H.1	Max	272	33.0	160	1,580	12.5	6.0
	Min	0	0.2	0	58	1.7	0.0
	Avg	124	4.4	56	337	5.9	0.6
H.2	Max	212	9.0	200	614	10.6	1.6
	Min	23	0.1	3	134	1.7	0.1
	Avg	97	2.9	55	305	6.1	0.5
H.3	Max	146	3.6	140	419	10.5	–
	Min	68	0.4	4	140	0.9	–
	Avg	113	1.3	50	299	4.7	–
H.4	Max	127	5.0	80	9,800	8.6	0.6
	Min	13	0.8	20	110	1.5	0.2
	Avg	97#	2.2+	50#	907	6.1	0.3
LM.1	Max	10	1.2	120	1,260	10.2	0.4
	Min	10	0.4	120	62	3.1	0.4
	Avg	10#	0.9+	120#	157	6.6	0.4#
TB.1	Max	110	6.1	48	49,000	11.1	5.0
	Min	67	0.7	3	18,800	0.0	1.0
	Avg	97*	2.7	13	36,205	5.2	2.5
TB.2	Max	112	12.1	27	64,800	10.4	2.0
	Min	82	0.1	0	17,500	2.2	.0.5
	Avg	99*	3.1	11	43,203	6.7	1.6
TB.3	Max	117	8.2	42	55,900	14.4	1.8
	Min	77	0.1	0	18,000	0.6	0.0
	Avg	101	1.5	6	44,053	6.7	1.0

Note: To present as much information as possible from STORET data during January 1970-Dece
"average" column:

Absence of qualifier signal	The average presented
*	Average of at least
+	Average of less than
#	Average of less than
–	No data available.

SOURCE : ADAPTED FROM TEXAS INSTRUMENTS, 1978

TABLE IV-3

C WATER QUALITY FOR PLANNING AREA, JANUARY 1970-DECEMBER 1976

Dissolved Oxygen (mg/ℓ)	Fluoride (mg/ℓ)	Nitrate-N (mg/ℓ)	Ammonia-N (mg/ℓ)	Organic-N (mg/ℓ)	pH (pH unit)	Ortho Phosphate (mg/ℓ)	Total Phosphate (mg/ℓ)	Temperature (°C)	Turbidity (JTU)	TOC (mg/ℓ)	Hardness (mg/ℓ)	Total Coliform† (No./100 mℓ)
6.6	4.6	1.00	3.70	0.70	8.1	–	–	28.0	–	–	–	–
6.6	0.5	0.00	0.00	0.56	4.4	–	–	13.3	–	–	–	–
6.6 #	2.1	0.25	0.19	0.63 #	7.0	–	–	22.4	–	–	–	–
8.0	44.0	3.00	1.75	1.47	9.2	68.00	–	29.0	28.0	–	111	–
8.0	0.5	0.00	0.00	0.25	5.5	1.40	–	12.0	28.0	–	111	–
8.0 #	3.8	0.94	0.24	0.87	7.3	21.09	–	22.3	28.0 #	–	111 #	–
10.4	22.0	4.00	11.80	2.10	7.7	–	62.00	29.0	30.0	92.0	470	–
2.2	1.9	0.00	0.00	0.06	4.8	–	0.05	13.0	1.0	5.0	180	–
7.0	10.7	0.91	0.70	0.58	6.7	–	15.23	23.0	6.3	20.5	278	–
11.0	0.8	4.00	1.64	1.10	8.3	83.00	1.40	32.0	7.5	22.0	100	43,500
1.1	0.3	0.00	0.01	0.46	5.8	0.86	0.16	9.4	1.0	8.0	70	200
6.2	0.6	0.79	0.23	0.80	7.1	22.05 *	0.77	22.8	3.5 *	15.6	85 #	5,226 *
5.4	44.0	1.00	15.00	4.88	9.1	–	–	30.0	4.4	–	–	–
1.4	0.3	0.00	0.00	0.65	4.4	–	–	12.0	4.4	–	–	–
3.0 #	6.2	0.24	0.35	1.14	6.8	–	–	21.7	4.4 #	–	–	–
10.0	6.6	1.20	1.10	1.70	8.0	–	9.00	29.0	20.0	25.0	200	–
0.8	0.5	0.00	0.00	0.31	6.2	–	2.90	10.0	1.0	9.0	90	–
6.5	3.3	0.28	0.11	0.78	7.0	–	4.88	22.6	4.3	14.4	132	–
10.2	55.0	7.10	2.00	2.72	8.8	38.00	25.00	33.0	30.0	55.0	290	80
1.8	0.3	0.00	0.00	0.04	5.2	2.80	0.05	8.0	1.0	1.0	140	80
7.0	5.8	0.63	0.22	0.69	7.2	8.22	8.98	22.5	7.1	11.2	201	80 #
12.1	14.4	4.82	1.83	0.27	7.9	21.30	–	29.0	28.0	22.0	220	21,000
3.9	0.2	0.15	0.06	0.02	7.9	5.46	–	17.0	1.0	2.0	220	100
6.7 *	5.6 *	1.45 *	0.38 *	0.13 #	7.9 #	12.91 *	–	23.5 *	4.9 *	10.3 *	220 #	3,042 *
12.8	12.0	4.24	1.27	2.10	8.5	6.90	–	31.0	14.0	24.7	4,527	56,000
0.3	0.7	0.00	0.00	0.00	6.7	0.70	–	12.2	1.0	1.2	4,313	200
6.1	4.6	0.57	0.16	0.78	7.5	2.92	–	24.5	5.1	7.9	4,420 #	2,455 *
12.5	6.0	5.00	5.20	1.50	8.3	1.20	1.40	34.0	15.0	50.0	180	30,800
1.7	0.0	0.00	0.01	0.15	6.8	0.18	0.16	6.7	2.0	4.0	68	200
5.9	0.6	0.86	0.37	0.73	7.5	0.56 *	0.44	23.2	6.0	15.8	124	5,883
10.6	1.6	3.00	0.73	5.40	9.3	9.80	1.40	34.0	88.0	250.0	190	–
1.7	0.1	0.00	0.00	0.00	4.6	0.50	0.23	11.0	2.0	3.0	49	–
6.1	0.5	0.20	0.10	1.27	7.3	1.80	0.68	23.7	10.6	29.7	102	–
10.5	–	3.90	3.70	1.60	8.6	–	1.00	31.8,	13.0	24.0	170	–
0.9	–	0.00	0.00	0.08	4.7	–	0.24	13.5	1.0	0.0	88	–
4.7	–	0.48	0.18	0.73	7.3	–	0.54	24.1	3.5	11.9	130	–
8.6	0.6	1.31	0.08	1.80	8.1	–	0.42	30.0	2,100.0	28.0	180	2,000
1.5	0.2	0.01	0.01	0.06	7.3	–	0.32	15.5	0.8	3.0	32	2,000
6.1	0.3	0.13 *	0.05 #	0.54 *	7.8 #	–	0.37 #	23.6	70.6	13.9	129 #	2,000 #
10.2	0.4	–	–	0.69	7.1	–	–	29.0	4.0	33.0	23	–
3.1	0.4	–	–	0.46	6.5	–	–	13.0	2.8	0.0	23	–
6.6	0.4 #	–	–	0.58 #	6.8 #	–	–	21.9	3.4 #	15.4 +	23 #	–
11.1	5.0	0.32	1.20	7.80	8.7	3.70	3.80	33.2	27.0	17.0	31,000	122,000
0.0	1.0	0.00	0.00	0.26	6.5	1.00	0.74	15.5	0.0	1.0	3,440	100
5.2	2.5	0.05	0.30	0.91	8.0	1.88	1.95	25.4	5.9	7.1	7,963 #	5,431 *
10.4	2.0	1.00	1.10	2.50	8.6	1.50	1.40	33.0	24.0	26.0	4,200	6,400
2.2	0.5	0.00	0.01	0.00	7.1	0.87 *	0.02	15.0	0.7	0.0	1,400	100
6.7	1.6	0.02	0.18	0.59	8.2	1.08 *	0.64	24.6	4.6	6.2	3,475 #	551 *
14.4	1.8	0.82	0.75	1.20	8.6	5.70	2.60	32.2	32.0	14.0	5,968	1,900
0.6	0.0	0.00	0.02	0.09	6.8	0.30	0.25	12.0	0.0	0.0	4,400	2
6.7	1.0	0.02	0.16	0.51	8.2	1.53	1.00	24.3	3.9	4.4	5,046 *	140 *

ing January 1970-December 1976 and still keep the data validity in consideration, certain qualifier signals are included along with actual data values in the

The average presented is of at least 10 observations spanning a period of at least 3 years during January 1970-December 1976.

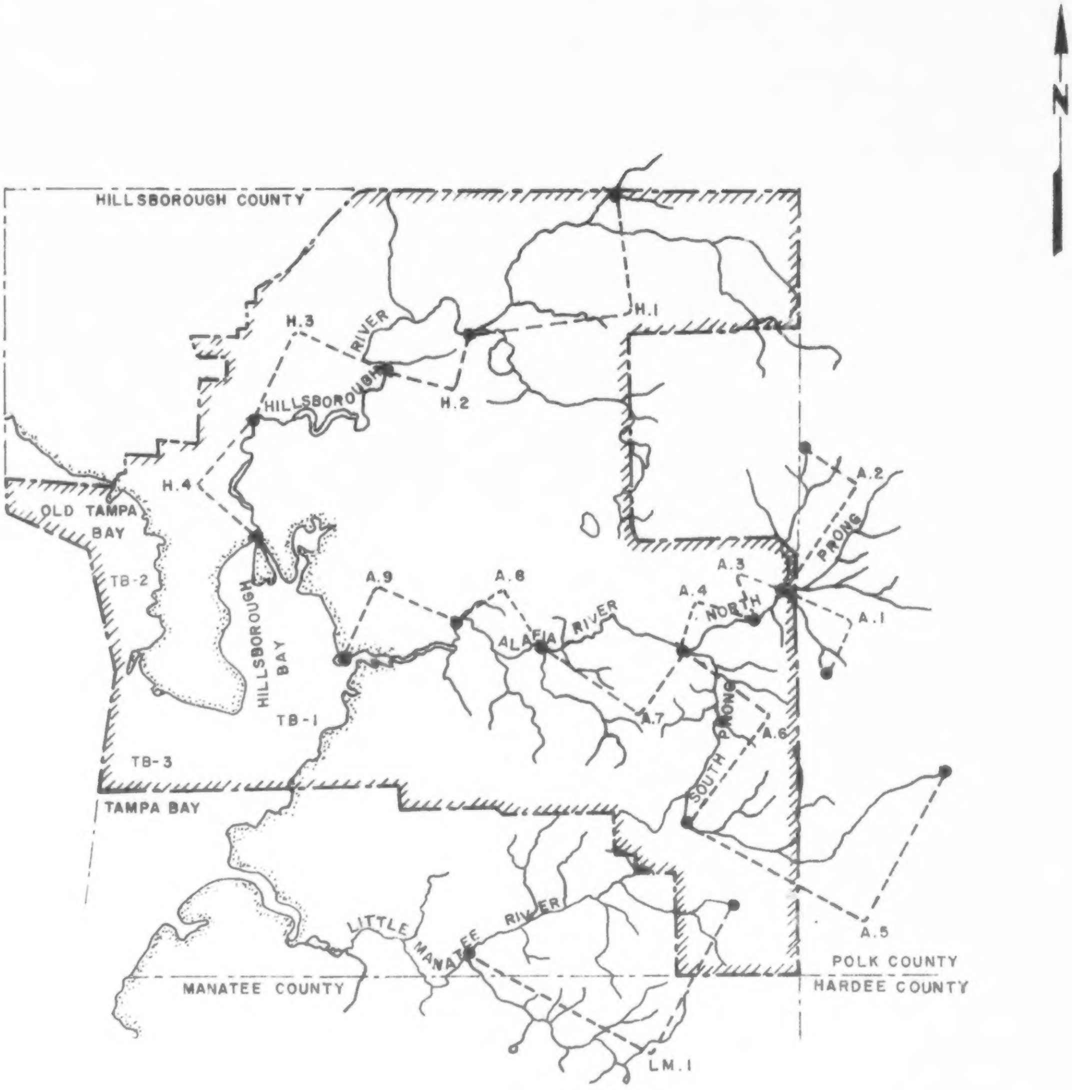
Average of at least 10 observations not spanning a period of 3 years for each station within the segment.

Average of less than 10 observations spanning a 3-year period

Average of less than 10 observations spanning a period of less than 3 years.

No data available.

MENTS, 1978


N
HILLSBOROUGH COUNTY
H.1
H.3
RIVER
HILLSBOROUGH
H.2
H.4
OLD TAMPA BAY
TB-2
HILLSBOROUGH BAY
TB-1
TB-3
TAMPA BAY
A.2
PRONG
A.3
A.1
A.9
A.8
A.4
NORTH
ALAFIA RIVER
A.7
SOUTH PRONG
A.6
A.5
LITTLE MANATEE RIVER
POLK COUNTY
HARDEE COUNTY
MANATEE COUNTY
LM.1

KEY:

▨ CENTRAL HILLSBOROUGH COUNTY - TAMPA 201 PLANNING AREA

H.1, H.2, ··· RIVER SEGMENT FOR WHICH WATER QUALITY DATA IS PRESENTED IN TABLE 3.6-2

SOURCE: ADAPTED FROM TEXAS INSTRUMENTS, 1978

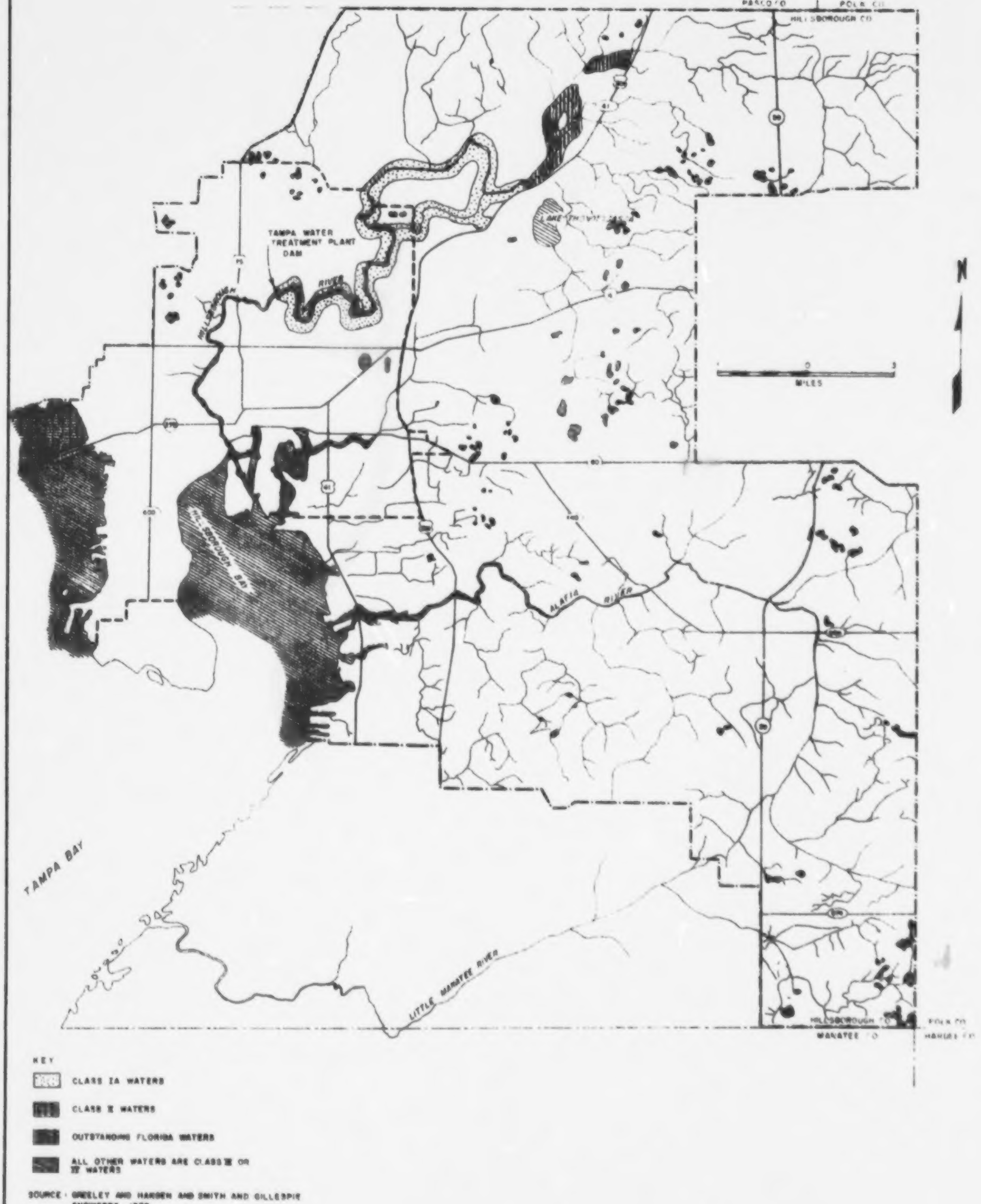
CENTRAL HILLSBOROUGH COUNTY - TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

WATER QUALITY SEGMENTS

DAMES & MOORE

FIGURE IV-7

iv-15


PASCO CO
POLK CO
HILLSBOROUGH CO
TAMPA WATER TREATMENT PLANT DAM
HILLSBOROUGH RIVER
LAKE THONOTOSASSA
HILLSBOROUGH BAY
ALAFIA RIVER
TAMPA BAY
LITTLE MANATEE RIVER
HILLSBOROUGH CO
POLK CO
MANATEE CO
HARDEE CO
MILES
N
KEY
CLASS IA WATERS
CLASS II WATERS
OUTSTANDING FLORIDA WATERS
ALL OTHER WATERS ARE CLASS III OR IV WATERS

SOURCE: GREELEY AND HANSEN AND SMITH AND GILLESPIE ENGINEERS, 1979

CLASSIFICATION OF SURFACE WATERS

CENTRAL HILLSBOROUGH COUNTY - TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

76580026 5/79

DAMES & MOORE

FIGURE IV-8

TABLE IV - 4

WATER QUALITY REQUIREMENTS FOR CLASS

MAXIMUM LIMITS*

PARAMETER	CLASS I-A WATERS	CLASS III WATERS PREDOMINANTLY FRESH WATER**	CLASS III WATERS PREDOMINANTLY MARINE WATER***
Alkalinity ($CaCO_3$)	Not less than 20 mg/l	Not less than 20 mg/l	—
Aluminum	—	—	1.5 mg/l
Ammonia	0.02 mg/l	0.02 mg/l	—
Antimony	—	—	0.2 mg/l
Arsenic	0.05 mg/l	0.05 mg/l	0.05 mg/l
Barium	1 mg/l	—	—
Beryllium	0.011 mg/l in waters with hardness less than 150 mg/l $CaCO_3$. 1.10 mg/l for harder waters	0.011 mg/l in waters with hardness less than 150 mg/l $CaCO_3$. 1.10 mg/l for harder waters	—
BOD	Shall not be increased to exceed values which would cause dissolved oxygen to be depressed below the limit established for each class.		
Bromine	—	—	0.1 mg/l
Bromates	—	—	100 mg/l
Cadmium	0.8 ug/l in waters with hardness less than 150 mg/l $CaCO_3$ 1.2 ug/l otherwise.	0.8 ug/l in waters with hardness less than 150 mg/l $CaCO_3$ 1.2 ug/l otherwise.	5.0 ug/l
Chloride	250 mg/l	—	Not increase more than 10% over natural background.
Chlorine (total residual)	0.01 mg/l	0.01 mg/l	0.01 mg/l
Chromium	0.05 mg/l	0.05 mg/l	0.05 mg/l
Coliforms (Total)	1000/100 ml (monthly average) 2400/100 ml (anytime)	1000/100 ml (monthly average) 2400/100 ml (anytime)	1000/100 ml (monthly average) 2400/100 ml (anytime)
Copper	30 ug/l	0 3 mg/l	0.015 mg/l
Cyanide	5.0 ug/l	5.0 ug/l	5.0 ug/l
Detergents	0.5 mg/l	0.5 mg/l	0.5 mg/l
Dissolved Oxygen	Not less than 5 mg/l	Not less than 5 mg/l	Not less than 5 mg/l (24 hour average) Not less than 4 mg/l (anytime)
Dissolved Solids	500 mg/l (monthly avg.) 1000 mg/l (anytime)		
Fluorides (F)	1.5 mg/l	10.0 mg/l	5.0 mg/l
Iron	0.3 mg/l	1.0 mg/l	0.3 mg/l
Lead	0.03 mg/l	0.03 mg/l	0.05 mg/l
Mercury	0.2 ug/l	0.2 ug/l	0.1 ug/l
Nickel	0.1 mg/l	0.1 mg/l	0.1 mg/l
Nitrate (N)	10 mg/l	—	—
Nutrients	In no case shall nutrient concentrations of a body of water be altered so as to cause an inbalance in natural populations of aquatic flora or fauna.		
Oils & Grease	5.0 mg/l	5.0 mg/l	5.0 mg/l

SOURCE: CHAPTER 17-3, FLORIDA ADMINISTRATIVE CODE

ABLE IV - 4

ENTS FOR CLASS I-A & III WATERS

MAXIMUM LIMITS*

PARAMETER	CLASS I-A WATERS	CLASS III WATERS PREDOMINANTLY FRESH WATER***	CLASS III WATERS PREDOMINANTLY MARINE WATER***
Pesticides & Herbicides			
Aldrin plus Dieldrin	0.003 ug/l	0.003 ug/l	0.003 ug/l
Chlordane	0.001 ug/l	0.01 ug/l	0.004 ug/l
DDT	0.001 ug/l	0.001 ug/l	0.001 ug/l
Demeton	0.1 ug/l	0.1 ug/l	0.01 ug/l
Endosulfan	0.003 ug/l	0.003 ug/l	0.001 ug/l
Endrin	0.004 ug/l	0.004 ug/l	0.004 ug/l
Guthion	0.01 ug/l	0.01 ug/l	0.01 ug/l
Heptachlor	0.001 ug/l	0.001 ug/l	0.001 ug/l
Lindane	0.01 ug/l	0.01 ug/l	0.04 ug/l
Malathion	0.1 ug/l	0.1 ug/l	0.1 ug/l
Methoxychlor	0.03 ug/l	0.03 ug/l	0.03 ug/l
Mirex	0.001 ug/l	0.001 ug/l	0.001 ug/l
Parathion	0.04 ug/l	0.04 ug/l	0.04 ug/l
Toxaphene	0.005 ug/l	0.005 ug/l	0.005 ug/l
2-4-D	100 ug/l	—	—
2,4,5-TP	10 ug/l	—	—
pH	Not less than 6.0 Not more than 8.5	Not less than 6.0 Not more than 8.5	Not less than 6.5 Nor more than 8.5
Phenolic Compounds	1.0 ug/l	1.0 ug/l	1.0 ug/l
Phospherous (Elemental)	—	—	0.1 ug/l
Phthalate Esters	3.0 ug/l	3.0 ug/l	—
Polychlorinated Biphenyls	0.001 ug/l	0.001 ug/l	0.001 ug/l
Radium - 226, 228	5 picocuries/l	5 picocuries/l	5 picocuries/l
Gross Alpha	15 picocuries/l	15 picocuries/l	15 picocuries/l
Selenium	0.01 mg/l	0.025 mg/l	0.025 mg/l
Silver	0.07 ug/l	0.07 ug/l	0.05 ug/l
Turbidity	50 Jackson Units above natural background	50 Jackson Units above natural background	50 Jackson Units above natural background
Zinc	0.03 mg/l	0.03 mg/l	1.0 mg/l

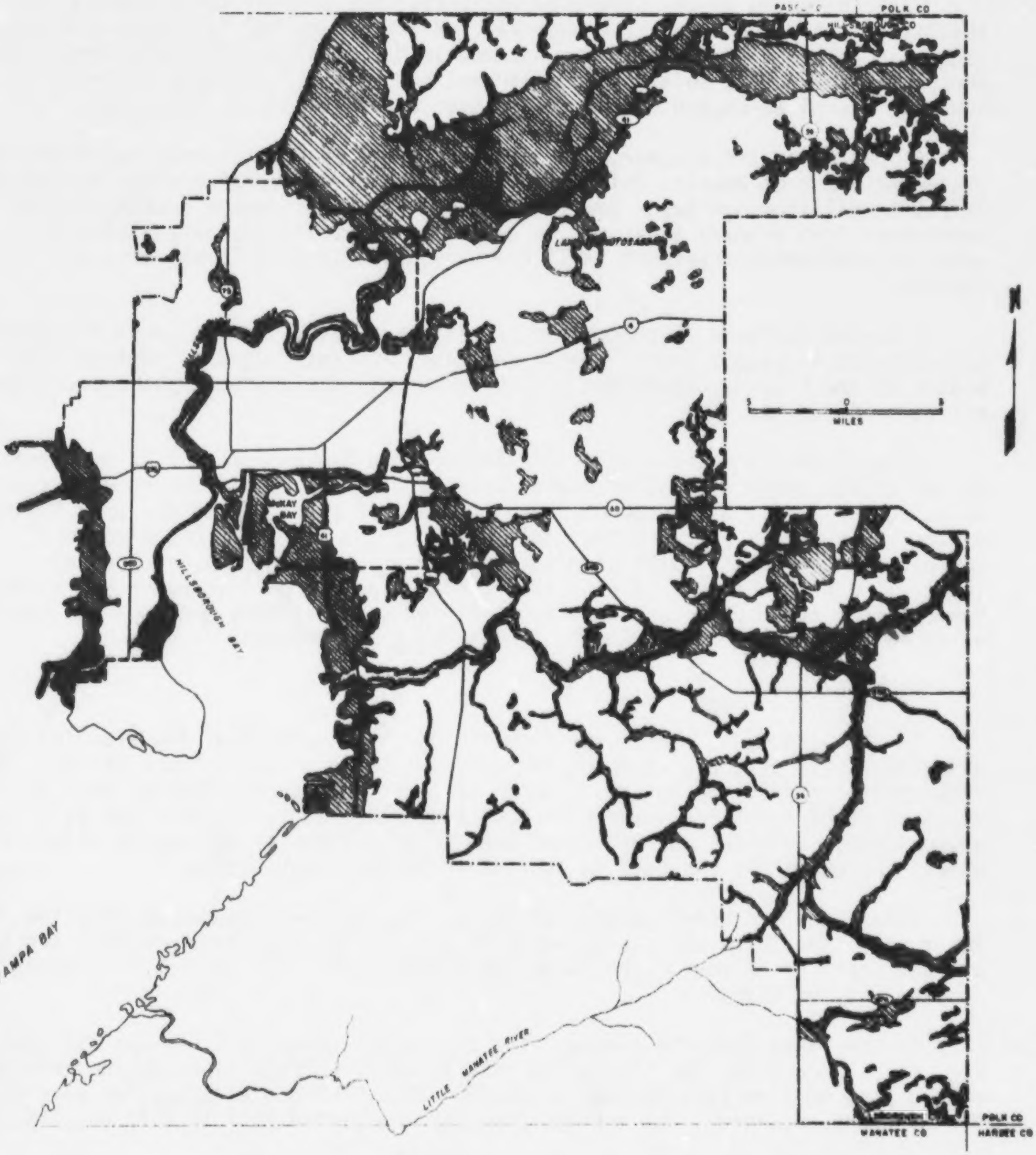
* Unless otherwise noted - violations of these criteria constitute pollution.

** "Predominantly Fresh Waters" means those surface waters in which the specific conductance of the water at the surface is less than 5,000 micromhos per centimeter.

*** "Predominantly Marine Waters" means those surface waters in which the specific conductance of the water at the surface is greater than or equal to 5,000 micromhos per centimeter.

mg/l = milligrams per liter.
ug/l = micrograms per liter.

iv-17


PASCO CO
POLK CO
HILLSBOROUGH CO
LAKE THONOTOSASSA
N
MILES
MCKAY BAY
HILLSBOROUGH BAY
TAMPA BAY
LITTLE MANATEE RIVER
HILLSBOROUGH CO
POLK CO
MANATEE CO
HARDEE CO

KEY

▨ FLOOD PRONE AREA (AREAS OF 100 - YEAR FLOOD)

SOURCES: U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPEMENT
FEDERAL INSURANCE ADMINISTRATION, 1977a, 1977c

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FLOOD PRONE AREAS
CENTRAL HILLSBOROUGH COUNTY - TAMPA PLANNING AREA

DAMES & MOORE

FIGURE IV-9

Data collected during 1970-1976 indicates that some of the poorest water quality exists in upper Hillsborough Bay. Hillsborough Bay is observed to be higher in color, fluoride, nitrate-N, ammonia-N, organic-N, orthophosphate, total phosphate, turbidity, total organic carbon, hardness and coliform bacteria, and lower in dissolved oxygen and pH than either Old Tampa Bay or Tampa Bay.

At one time, the discharge of primary-treated wastewater from the Tampa sewage treatment plant at Hookers Point was a major factor in lowering dissolved oxygen levels in Hillsborough Bay. However, the Hookers Point sewage treatment plant has progressed from primary treatment to secondary treatment (January, 1977) to advanced wastewater treatment (AWT) (January, 1979) and DO levels have started to improve.

A marked decrease in phosphorus and nitrogen levels in the Tampa Bay System has occurred in recent years. These decreases are attributed to restrictions placed by the Florida Department of Environmental Regulation on phosphorus and nitrogen discharges.

Changes in the water quality of Hillsborough Bay as a result of implementation of AWT at the Hookers Point treatment plant and reductions in other point source discharges will not likely be observed for several years due to the poor flushing of the bay system. Consequently, even during 1978, bacteria concentrations represented a serious source of water pollution. Swimming was discouraged (bacteria contamination exceeding 1000 colonies per 100 ml) in upper Hillsborough Bay and near the mouth of the Alafia River for seven or more months. The remainder of the Bay was unsafe for swimming from three to six months.

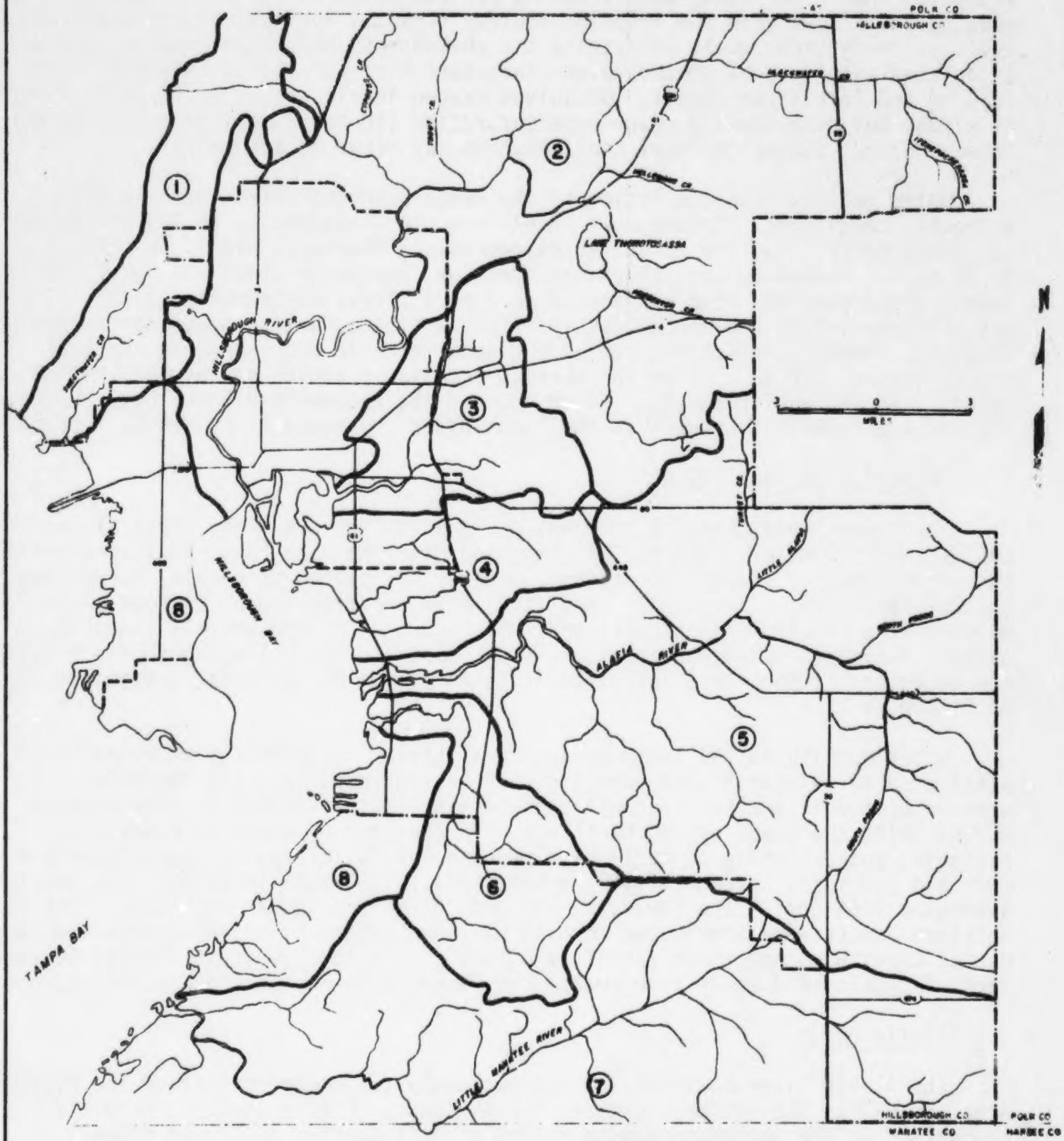
Hillsborough River

The Hillsborough River flows from the northeast corner of the Planning Area in a southwesterly direction through Tampa to Hillsborough Bay (Figure IV-10). The river drains nearly the entire northern half of the Planning Area as well as portions of Hernando, Pasco and Polk Counties. The length of the river is approximately 54 miles and drains an area of approximately 690 square miles, of which, approximately one-half is located in Hillsborough County.

Within the incorporated area of Tampa, the river was dammed to form the Tampa Reservoir. The reservoir stores water in the Hillsborough River channel and has an average depth of 15 feet. The Tampa Reservoir serves as a source of drinking water for the City of Tampa.

At the Tampa Dam, the average flow of the Hillsborough River was 598 cubic feet per second (cfs) for the period 1938 to 1977. Stream flows during this period ranged from no flow to a maximum of 16,500 cfs. Upstream at a station near the Planning Area boundary, the average flow for the period 1939 to 1977 was 266 cfs.

Extensive sampling of the Hillsborough River has been conducted at the upstream incorporation limits of Temple Terrace. Dissolved oxygen is frequently below 5 mg/l and as low as 1 mg/l in the morning. BOD is also generally low. Nitrate and orthophosphate nutrients are moderately high. Total coliforms are often high. Fecal contamination is attributed to livestock sources. Nutrient and organic concentrations reflect water quality conditions throughout the upstream drainage area. The river also has neutral to slightly alkaline pH, low turbidity, moderate color and moderately high conductivity. No problems exist with arsenic, cadmium, lead, copper, nickel and zinc. However, mercury is reported to exceed EPA criteria (TBRPC, 1977a).


POLK CO
HILLSBOROUGH CO
①
②
③
④
⑤
⑥
⑦
⑧
⑧
LAKE THONOTOSASSA
HILLSBOROUGH RIVER
SWEETWATER CR
HILLSBOROUGH BAY
ALAFIA RIVER
LITTLE MANATEE RIVER
TAMPA BAY
N
3 0 3
MILES
HILLSBOROUGH CO
POLK CO
MANATEE CO
HARDEE CO

DRAINAGE BASINS:

① SWEETWATER CREEK
② HILLSBOROUGH RIVER
③ PALM RIVER / SIXMILE CREEK
④ DELANEY CREEK
⑤ ALAFIA RIVER
⑥ BULLFROG CREEK
⑦ LITTLE MANATEE RIVER
⑧ COASTAL STREAMS

KEY
━━ DRAINAGE BASIN BOUNDARY

SOURCE HILLSBOROUGH COUNTY PLANNING COMMISSION, 1974; WRIGHT, 1974; DAMES & MOORE, 1975; SMITH & GILLESPIE, GREELEY & HANSEN, 1975

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DRAINAGE BASINS IN PLANNING AREA

DAMES & MOORE

FIGURE IV-10

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Extensive sampling of the Hillsborough River downstream of Blackwater Creek indicates that river flow, except during periods of very high discharge, is largely made up of inflows from the artesian aquifer (Crystal Springs) or the water table aquifer. Very high levels of nitrate and phosphorous have been reported and may be associated with natural ground water characteristics as well as livestock waste loading and fertilizer runoff. Dissolved oxygen levels are generally 4 to 6 mg/l at midday but occasionally reach supersaturation (10 to 12 mg/l depending on water temperature). Excessive fecal contamination may occur occasionally.

Water quality characteristics of the Tampa Reservoir also indicate high eutrophic conditions. Chlorophyll levels are high, ranging up to 160 milligrams per cubic meter. Daytime dissolved oxygen values fluctuate widely, ranging from 3 to 14 mg/l. Phosphate concentrations are high, averaging about 0.3 mg/l. Nitrate levels are frequently high ranging up to 2 mg/l (Texas Instruments, 1978). Sodium and chloride values are approximately twice as high as values measured at upstream stations. However, chloride, sodium and other organic and inorganic chemical concentrations are well below the maximum acceptable limits set by the EPA for raw waters used for public supply. Color exceeds the recommended level but is removed through the treatment process at the Tampa Water Treatment Plant (TBRPC, 1977).

Tampa Bypass Canal System

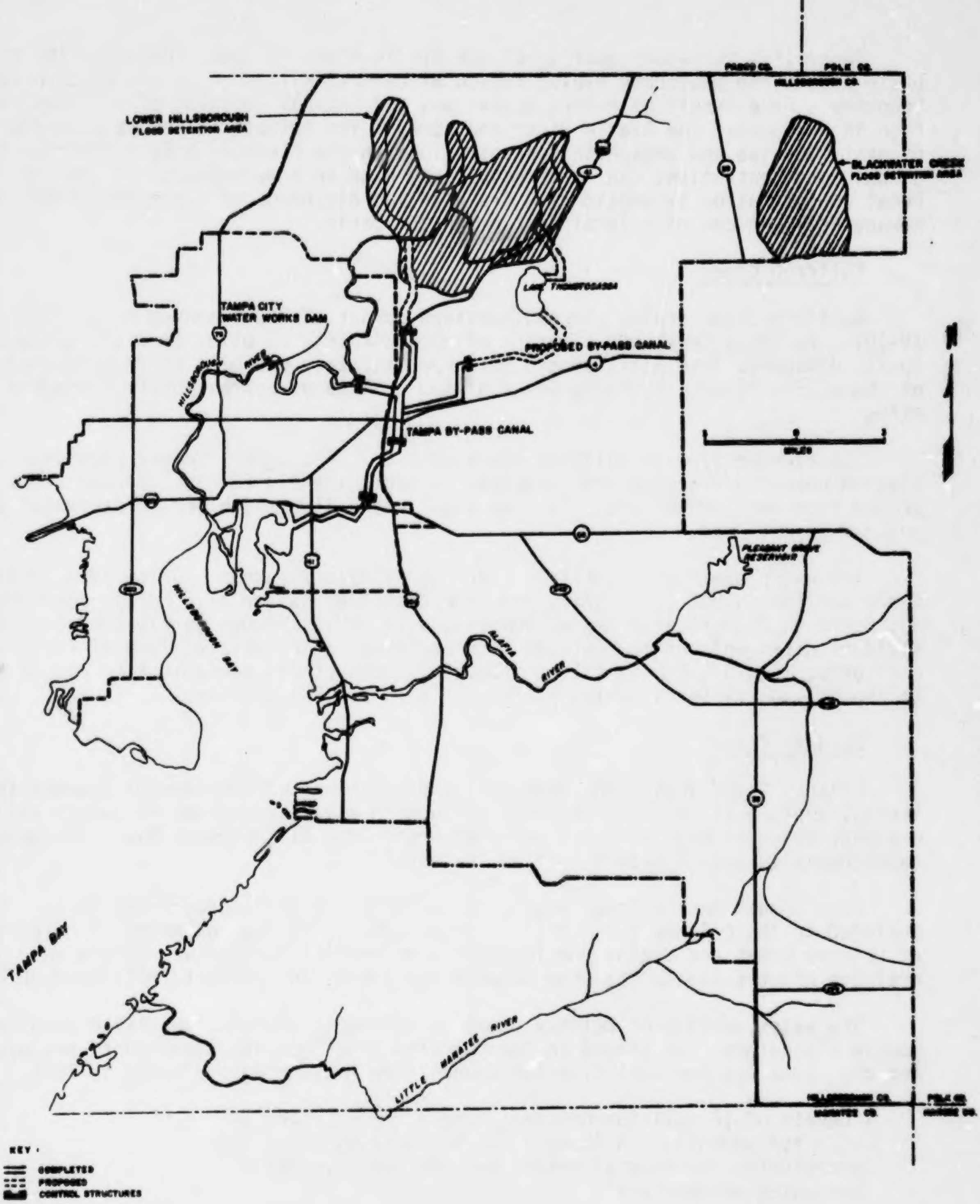
The Tampa Bypass Canal system was designed by the U.S. Army Corps of Engineers to divert flood waters from the Hillsborough River to McKay Bay, thus, protecting the urban areas of Temple Terrace and Tampa. This system of canals, levees and control structures is partially completed, with construction or planned construction, of the remaining links well underway. As part of the overall flood control system, two flood detention areas are planned within the Hillsborough River basin. The locations of the flood detention areas and Tampa Bypass canal system are shown on Figure IV-11.

Water quality in the Tampa Bypass Canal system is generally poor and is attributed to industrial and domestic waste discharges, landfill leachate, stormwater runoff and the channelization of the Palm River and Sixmile Creek. During 1978, the Tampa Bypass Canal was characterized by high chlorophyll-a, averaging approximately 30 mg/l; high BOD and low DO, averaging approximately 4.6 mg/l and 1.8 mg/l, respectively; low nutrients, 0.033 mg/l (nitrate); and low TOC, averaging 9.64 mg/l. The low nutrients and TOC values appear anomalous. The low nutrient values were attributed to high nitrogen uptake by algae because the Tampa Bypass Canal was "notorious for algae blooms". The low TOC is attributed to the lack of tannic acid water from swamps and floodplains due to channelization.

Alafia River

The Alafia River basin drains approximately the southern half of the Planning Area as well as the western portion of Polk County (Figure IV-10). From its headwaters in the phosphate mining region of Polk County, the river flows approximately 24 miles in a westerly direction, discharging at the southern end of Hillsborough Bay. The Alafia River and tributaries drain an area of approximately 460 square miles.

The lower reaches of the river are tidal. During periods of low flow, tidal effects can be observed as far as ten miles upstream of the river mouth. The average annual flow in the Alafia River at a station located on Florida Route 640 is 367 cfs for the period 1932 to 1977. Flows observed during this period ranged from a minimum of 7 cfs to a maximum of 45,900 cfs.


PASCO CO.
POLK CO.
HILLSBOROUGH CO.
LOWER HILLSBOROUGH FLOOD DETENTION AREA
BLACKWATER CREEK FLOOD DETENTION AREA
LAKE THONOTOSASSA
TAMPA CITY WATER WORKS DAM
HILLSBOROUGH RIVER
PROPOSED BY-PASS CANAL
TAMPA BY-PASS CANAL
MILES
PLEASANT GROVE RESERVOIR
HILLSBOROUGH BAY
ALAFIA RIVER
TAMPA BAY
LITTLE MANATEE RIVER
HILLSBOROUGH CO.
MANATEE CO.
POLK CO.
HARDEE CO.
KEY:
COMPLETED
PROPOSED
CONTROL STRUCTURES

SOURCES:
WEST COAST REGIONAL WATER SUPPLY AUTHORITY REPORT, 1978.
TAMPA BAY REGIONAL PLANNING COUNSEL, 1978a
CORPS OF ENGINEERS, 1977b

CENTRAL HILLSBOROUGH COUNTY - TAMPA
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LOCATION OF MAJOR SURFACE WATER CONTROLS AND ARTIFICIAL DRAINAGE NETWORKS

[illegible]

FIGURE IV-11

Generally, the water quality of the Alafia River is good. However, the river basin drains the phosphate mining region of central Hillsborough and western Polk Counties. As a result of mining operations and natural leaching of soil and rock rich in phosphate, the Alafia River and some of its tributaries contain some of the highest fluoride and phosphate concentrations in the Planning Area. Nitrogen(as ammonia) concentrations can at times be very high in some segments of the river. Fecal contamination by septic tank drainage and discharge of improperly treated sewage effluent can be a local problem in the basin.

Bullfrog Creek

Bullfrog Creek drains the southwestern corner of the Planning Area (Figure IV-10). Bullfrog Creek has a length of approximately 15 miles from its headwaters to its discharge into Hillsborough Bay, approximately one mile south of the mouth of the Alafia River. Bullfrog Creek drains an area of approximately 40 square miles.

The average flow in Bullfrog Creek at a U.S. Geological Survey recording station near the Planning Area boundary is approximately 28 cfs. Stream flows have varied from zero to 960 cfs. The new flow into Hillsborough Bay is estimated to be greater than 45 cfs.

The water quality of Bullfrog Creek is relatively good. During 1978, Bullfrog Creek was low in BOD (1.5 mg/l), moderate dissolved oxygen (7.9 mg/l), moderate nutrients (0.05 mg/l nitrogen as ammonia, 0.17 mg/l nitrogen as nitrate, 0.10 mg/l Kjeldahl nitrogen) and moderate to high bacteria indicators (858/100 ml fecal coliforms, 14,675/100 ml total coliforms). The bacteria contamination may be due to septic tank failures during periods of high soil saturation.

Delaney Creek

Delaney Creek drains the area west and southwest of the town of Brandon in the central portion of the Planning Area through an extensive system of canals and drainage ditches (Figure IV-10) and discharges into Hillsborough Bay. The natural watercourse is approximately 3 miles in length.

Even though Archie Creek discharges directly to Hillsborough Bay it is included in the Delaney Creek Basin. Archie Creek lies approximately 2 miles south of Delaney Creek and drains the lowlying area west of Riverview. Canals and drainage ditches divide the area between the creeks and drain to Hillsborough Bay.

The water quality of Delaney Creek is seriously degraded due largely to point source discharges. As stated in the "Updated Water Quality Assessment" prepared for the Tampa Bay Regional Planning Council for monitoring performed in 1976:

> "Levels of 16 mg/l for nitrate, 1 mg/l for nitrite, 14 mg/l for ammonia, and 40 mg/l for Kjeldahl nitrogen are astonishing for natural waters and are more typical of untreated wastewaters".

> "...Extremely high total coliforms (230,000/100 ml), fecal coliforms (25,000/100 ml), and fecal streptococci (25,000/100 ml) suggest point sources of untreated sewage effluents or improperly operating treatment units are discharging to the creek" (TBRPC, 1977b).

No data is available for Archie Creek.

8. SUBSURFACE WATER RESOURCES

The Planning Area is underlain by a thick sequence of relatively permeable sedimentary rocks which comprise a multi-aquifer system. The geology of this aquifer system is described in Part B, Section 5 of this chapter. This aquifer system is the major source of potable water for the Planning Area.

In the Planning Area, there are generally two primary aquifers used for water supply. These are: the shallow or water table aquifer; and, the principal artesian aquifer, known as the Floridan Aquifer. These units are separated by sediments of lower permeability which function as confining or semi-confining beds.

The water table (unconfined) aquifer consists of undifferentiated surficial sands and clays. Water supplies on the order of 10 gallons per minute (gpm), which are generally suitable for domestic use, may be obtained from this aquifer. Depth to the water table is shallow over most of the area.

The typical natural quality of waters in the surficial aquifer varies slightly from one place to another within the Planning Area. Away from the coastline, the water table aquifer is generally potable, slightly acidic, can be rich in organic material, but is low in dissolved solids. A hardpan of iron oxide-stained sands is found in some areas of the county which cause the surficial aquifer waters in contact with the hardpan to be higher in iron concentration than waters above or below the hardpan. In the coastal portions of the Planning Area, water quality in the surficial aquifer can be similar to seawater or brackish water.

The Floridan aquifer is one of the most productive in the world and is the major source of fresh ground water within the Planning Area. It is comprised of limestones and dolomites 1,000 feet or more in thickness. The aquifer includes all or parts of the middle to lower Eocene Avon Park, Lake City and Oldsmar limestones, the upper Eocene Ocala group, the Oligocene Suwannee limestone, and the Tampa limestone and permeable, hydraulically connected parts of the Hawthorn formation.

The depth to the base of the Floridan aquifer in the Planning Area ranges from less than -1000 feet MSL in the northeast to greater than -1400 feet MSL in the southeast. The major water bearing zones of the Floridan aquifer generally correspond to the top of a thick bed of massive, hard, highly fractured and often cavernous, dark brown dolomite occurring in the Avon Park limestone. These water producing zones in general are found below -400 feet MSL in the northeast to below -800 feet MSL in the southwest portions of the County (USGS, unpublished data, 1979b). A second production zone occurs within the Tampa-Suwannee limestones. Locally, where solution features are well developed, permeability (transmissivity) of this unit may be very high. Recent testing by Hillsborough County hydrologists indicate that in the Brandon area transmissivities in the upper part of the Floridan aquifer may be in excess of one million gallons per day per foot (gpd/ft).

Recharge of the confined artesian aquifers in the Planning Area is somewhat complex, occurring in several ways which include horizontal migration, recharge through sinkholes and vertical leakage through confining beds.

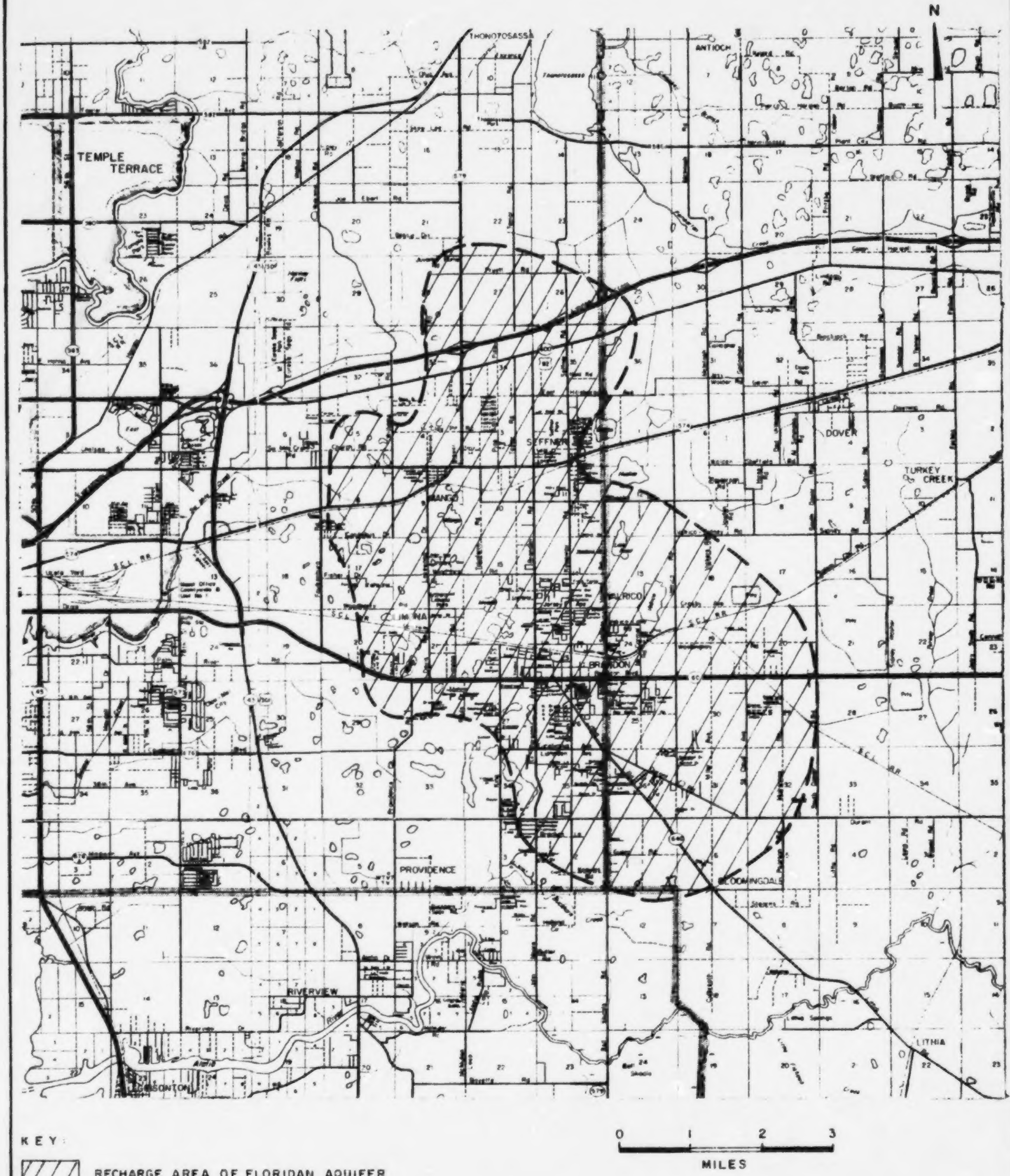
In central and northern Florida, rainfall enters the aquifer in the areas of limestone outcrop. Ground water migrates horizontally through the aquifer from these outcrop areas toward the coast, thus recharging the system. Recharge also occurs locally through the numerous sinkholes which penetrate the confining beds. Significant portions of the Planning Area contain recent and ancient sinkholes through which direct vertical recharge of the artesian aquifer occurs. Much of the area around Brandon is considered a recharge area of the Floridan Aquifer (Figure IV-12).

Under natural conditions, the quality of the Floridan Aquifer water in inland areas varies only slightly. The dissolved solids in the ground water consist primarily of carbonates, bicarbonates, chlorides, sulfates, calcium, magnesium and silica. In general, the quality of the water is within EPA criteria for drinking water. The general concentrations of dissolved solids, hardness, chloride and sulfate in the Planning Area are shown in Figure IV-13. Along the coast, the dissolved solids in the Floridan Aquifer water are much higher than in the inland areas as a result of the seaward direction of ground water flow and seawater intrusion. The intruded zone is commonly referred to as the "seawater wedge" because the inland limit of the zone tends to slope landward. In some cases, saltwater intrusion is extensive, contaminating previously fresh water supplies.

Contamination of the Floridan Aquifer may also occur through the recharge of the aquifer with contaminated surface water or ground water. Surface waters which may become contaminated can enter the aquifer where permeable limestone occurs at or near the surface or through sinkholes and defective wells. This type of contamination has occurred in northwest Tampa where a package wastewater treatment plant discharges effluent to Curiosity Creek. Downstream, the waters enter the ground water system in the Blue Sink area. Effluent has been detected over two miles away at Sulphur Springs, a source of water for the City of Tampa reservoir, (Greeley & Hansen, 1979).

Contamination of the water table aquifer can occur in several ways. Agricultural sources include the application of fertilizers, pesticides and insecticides on croplands, as well as animal waste products which percolate with surface water through the soil and into the ground water system. Local contamination can also occur through downward seepage from wastewater lagoons, septic systems, landfills and polluted surface waters. These contaminated ground waters may, in turn, enter the Floridan Aquifer.

In areas where water moves rapidly through the soils, the aquifer is shallow, or, confining materials are without sufficient natural filtering or ion exchange (for example, sinkholes or well-developed solution features, excessively permeable soils, absent confining beds), contamination may become a serious problem. Water quality analyses of samples from the Brandon municipal wellfield indicate slightly increased nitrate levels in the Floridan Aquifer which are attributed to septic tank systems in the local vicinity.


N
THONOTOSASSA
ANTIOCH
TEMPLE TERRACE
SEFFNER
MANGO
DOVER
TURKEY CREEK
LIMONA
VALRICO
BRANDON
PROVIDENCE
BLOOMINGDALE
RIVERVIEW
LITHIA
GIBSONTON
S.C.L. RR
0
1
2
3
MILES

KEY:

▨ RECHARGE AREA OF FLORIDAN AQUIFER

SOURCE:

SMITH AND GILLESPIE ENGINEERS, INC.

FLORIDAN AQUIFER RECHARGE AREA

CENTRAL HILLSBOROUGH COUNTY - TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

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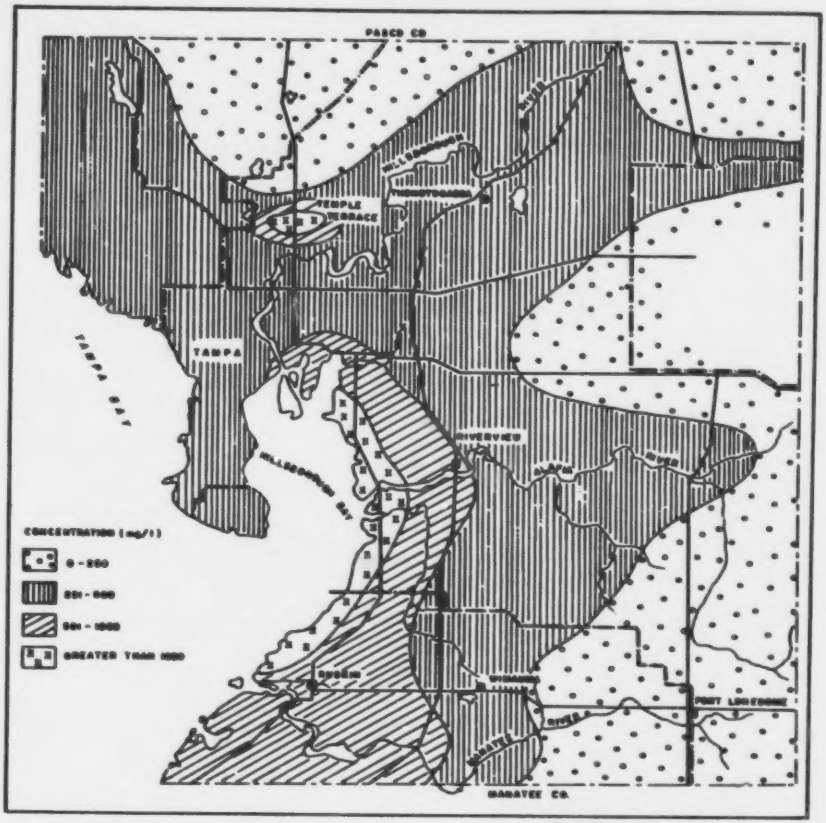
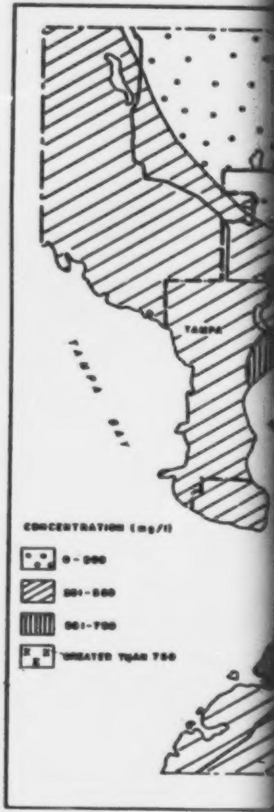
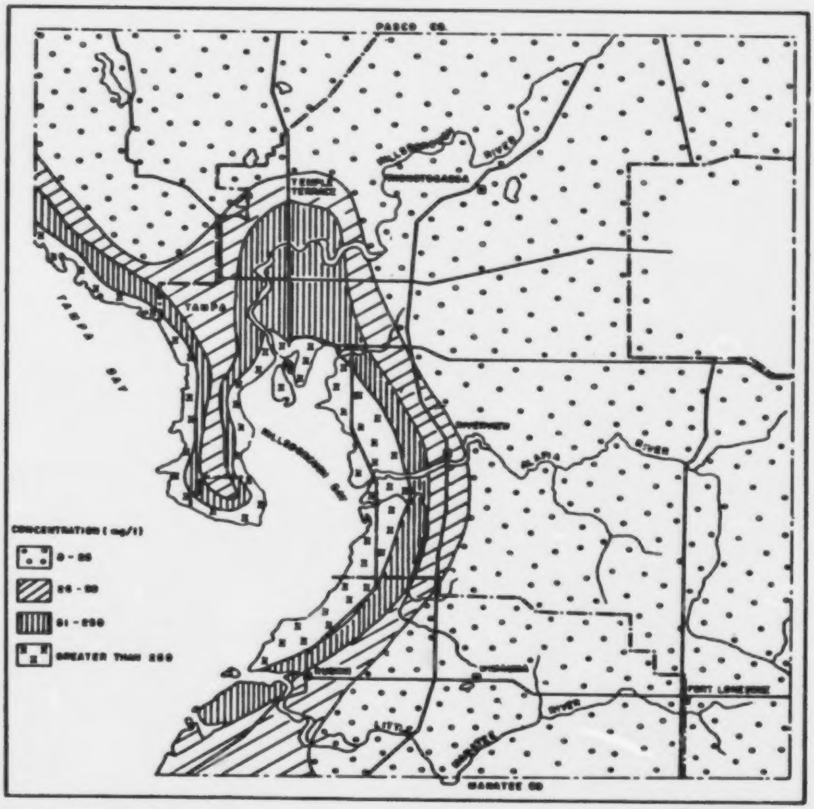
DAMES & MOORE

FIGURE IV-12

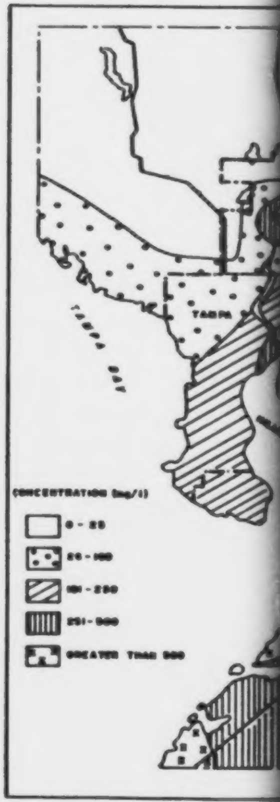

PASCO CO.
HILLSBOROUGH
RIVER
TEMPLE TERRACE
THONOTOSASSA
TAMPA
TAMPA BAY
HILLSBOROUGH BAY
RIVERVIEW
ALAFIA RIVER
RUSKIN
WIMAUMA
FORT LONESOME
MANATEE RIVER
MANATEE CO.
CONCENTRATION (mg/l)
0 - 250
251 - 500
501 - 1000
GREATER THAN 1000

DISSOLVED SOLIDS


TAMPA
TAMPA BAY
CONCENTRATION (mg/l)
0 - 300
301 - 500
501 - 700
GREATER THAN 700


PASCO CO.
HILLSBOROUGH
RIVER
TEMPLE TERRACE
THONOTOSASSA
TAMPA
TAMPA BAY
HILLSBOROUGH BAY
RIVERVIEW
ALAFIA RIVER
RUSKIN
WIMAUMA
FORT LONESOME
LITTLE MANATEE RIVER
MANATEE CO.
CONCENTRATION (mg/l)
0 - 25
26 - 50
51 - 250
GREATER THAN 250

CHLORIDE


TAMPA
TAMPA BAY
CONCENTRATION (mg/l)
0 - 25
26 - 100
101 - 250
251 - 500
GREATER THAN 500

CENTRAL HILLSBOROUGH COUNTY-TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

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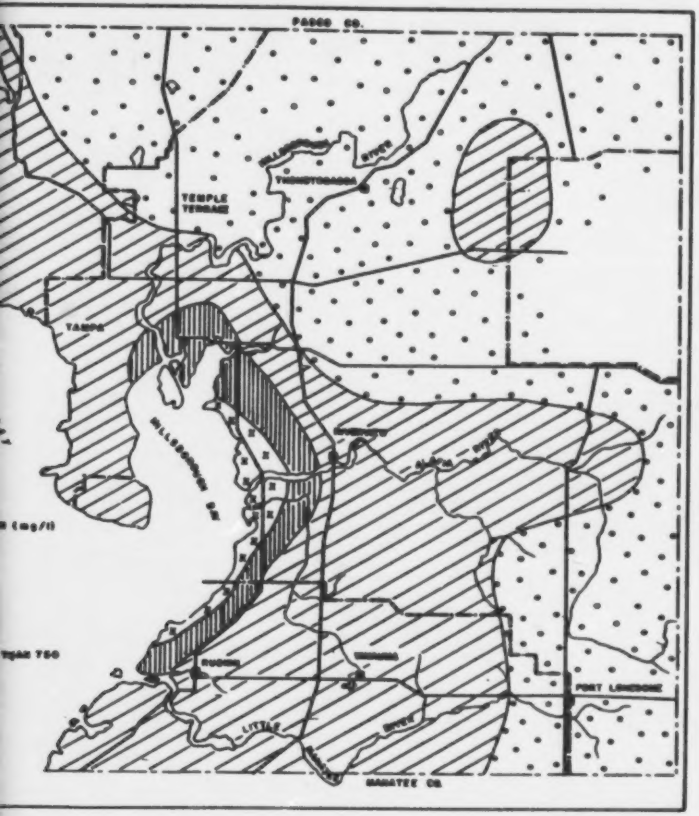
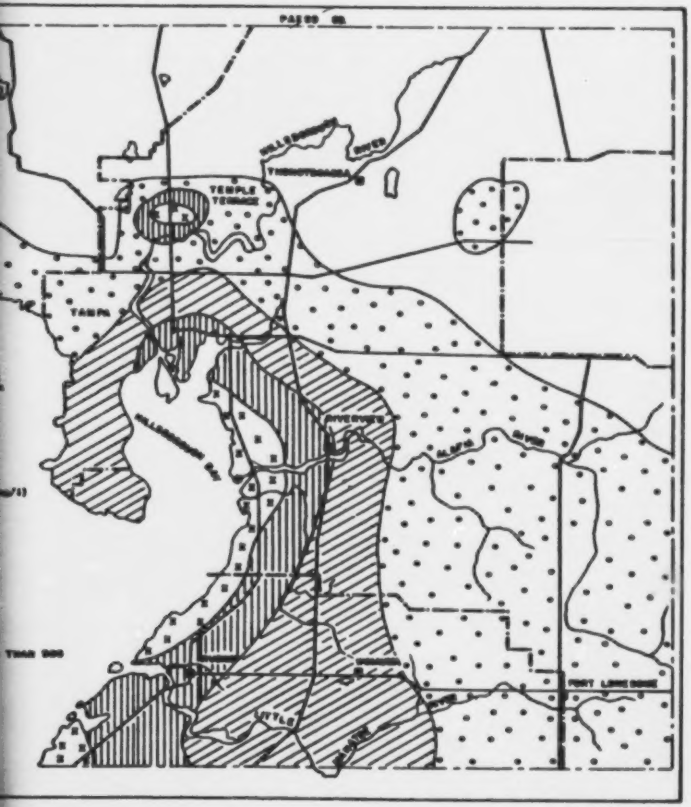

PASCO CO.
TEMPLE TERRACE
THONOTOSASSA
HILLSBOROUGH RIVER
TAMPA
HILLSBOROUGH BAY
RIVERVIEW
ALAFIA RIVER
RUSKIN
WIMAUMA
FORT LONESOME
LITTLE MANATEE RIVER
MANATEE CO.
(mg/l)
THAN 750

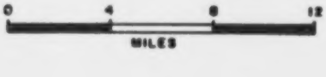
HARDNESS


PASCO CO.
TEMPLE TERRACE
THONOTOSASSA
HILLSBOROUGH RIVER
TAMPA
HILLSBOROUGH BAY
RIVERVIEW
ALAFIA RIVER
WIMAUMA
FORT LONESOME
LITTLE MANATEE RIVER
g/l)
THAN 500

SULFATE

SOURCES:

SHATTLES, P.E., 1965 ; DUERR, A.D., 1975 ; U.S. GEOLOGICAL SURVEY, 1977; WEST COAST REGIONAL WATER SUPPLY AUTHORITY, 1978


0
4
8
12
MILES

GENERALIZED WATER QUALITY
FLORIDAN AQUIFER
HILLSBOROUGH COUNTY, FLORIDA

DAMES & MOORE

FIGURE IV -13

9. TERRESTRIAL ECOLOGY

Vegetation

Mature ecosystems of a sufficient size to support major communities free from outside competitive influences are a fast-disappearing aspect of vegetational coverage within Hillsborough County. Many areas are either urbanized, developed for agricultural reasons or actively being cleared for industrial purposes. Natural terrestrial or wetland plant communities occurring in Hillsborough County include the following:

- An intertidal zone comprised of mangroves and salt marshes.
- A riverine forest comprised of cypress forests and hardwood forests; the latter can be subdivided to include bayheads, mixed hardwoods and mesic hammock.
- Cypress domes.
- Freshwater marshes.
- Pine flatwoods.
- Pine scrub oak sandhills comprised of longleaf pine scrub oak and pine scrub oak associations.
- Old fields.

The most ecologically productive and biologically sensitive communities in the study area are the wetlands. These land/water interfaces occur on low, poorly drained soil which is inundated for much or all of the year, on a "perched" water table, or along a flat intertidal zone. These wet conditions usually prevail long enough to promote the formation of hydric soils and a characteristic growth of aquatic macrophytes (or hydrophytes).

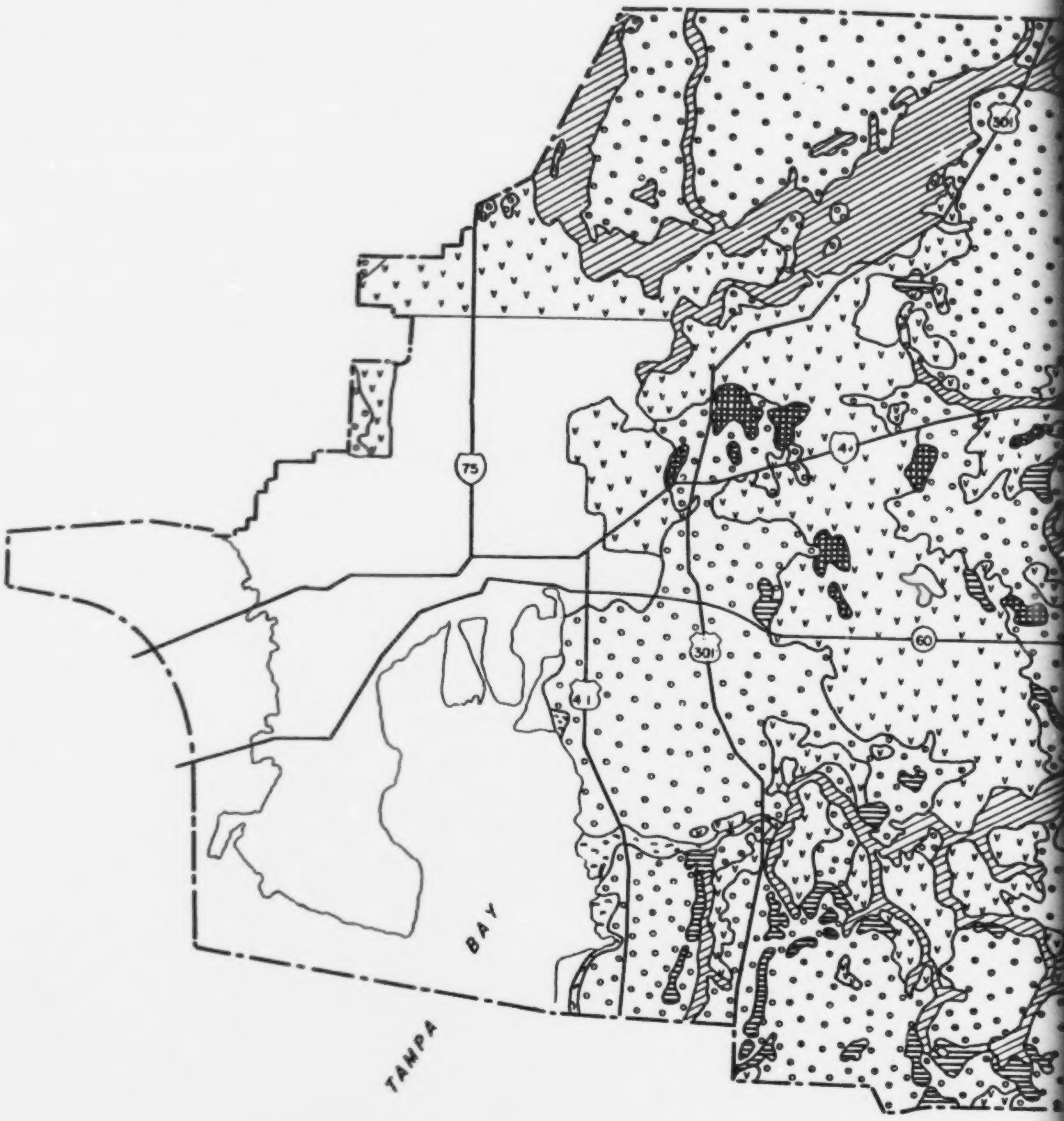
General vegetative communities inclusive of wetland areas are shown in Figure IV-14. Wetland areas within the Planning Area are shown separately in Figure IV-15.

Intertidal Zone - Within the intertidal zones within the Planning Area wetland communities include mangrove swamps and salt marshes. The mangrove swamps are characterized by red, black and white mangroves. Buttonwood or button mangrove is often found in association with these three species.

Within the Planning Area, mangrove swamps are located primarily in coastal areas south of the Alafia River, around Bullfrog Creek, along McKay Bay near the mouth of the Palm River, and on McDill Air Force Base. Other small areas where mangrove species still occur include the west side of Hillsborough Bay south of Ballast Point and along canals on the western portion of the Interbay Peninsula. Such areas, may be important in providing remnant pockets of biologically productive habitat in an area otherwise devoid of significant productivity. Total acreage of mangroves and associated species bordering Tampa Bay has been estimated at approximately 17,500 acres (Simon, 1974).

Although the primary intertidal vegetation type occurring in Tampa and Hillsborough Bay is mangrove swamp, there also remains a substantial intertidal marsh community. These salt marshes may be found adjacent to the mangrove swamps,

iv-28


75
41
301
41
60
301
TAMPA BAY

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EPA No. C120634010

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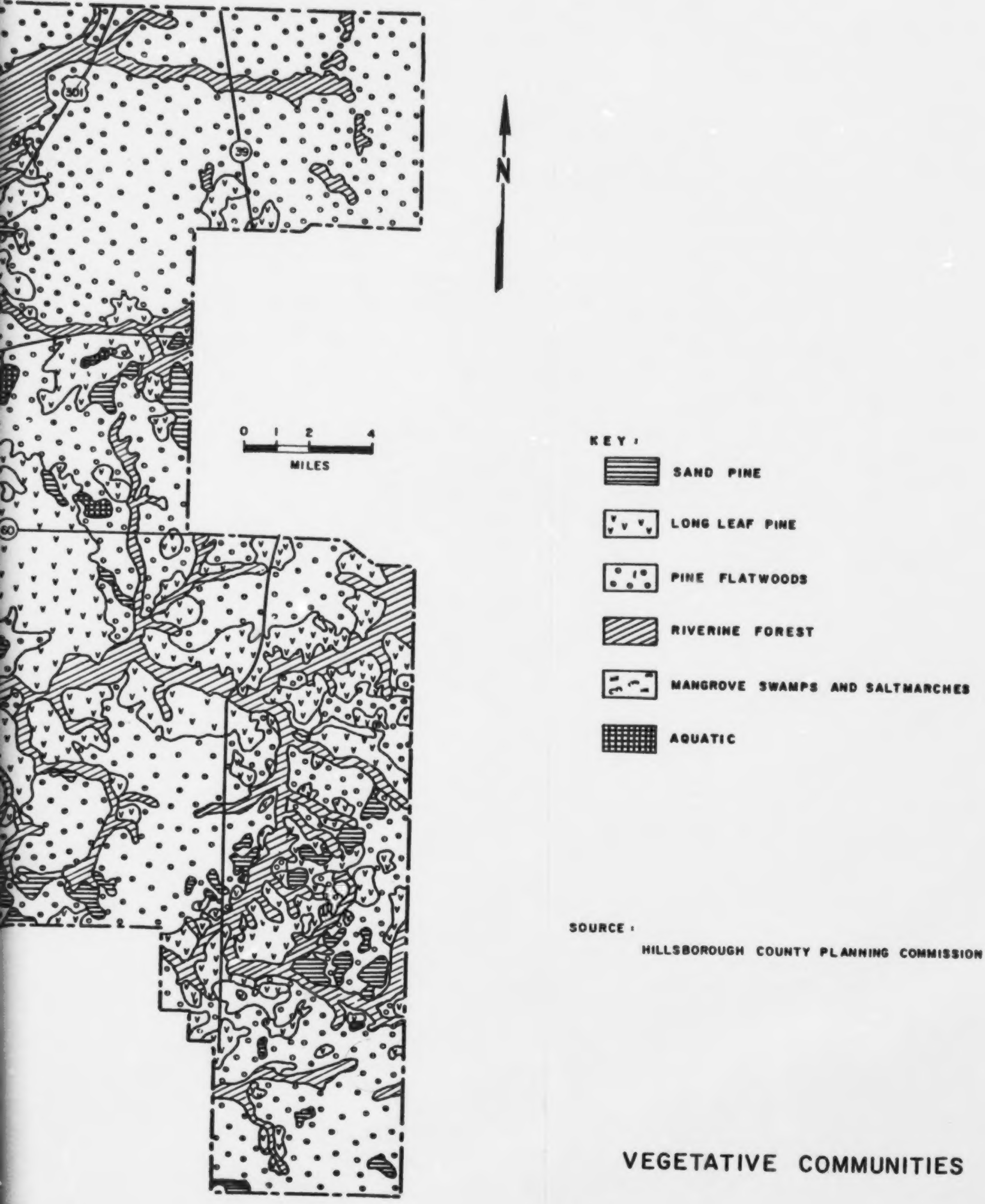
301
39
60
N
0 1 2 4
MILES
KEY:
SAND PINE
LONG LEAF PINE
PINE FLATWOODS
RIVERINE FOREST
MANGROVE SWAMPS AND SALTMARCHES
AQUATIC

SOURCE:
HILLSBOROUGH COUNTY PLANNING COMMISSION

VEGETATIVE COMMUNITIES

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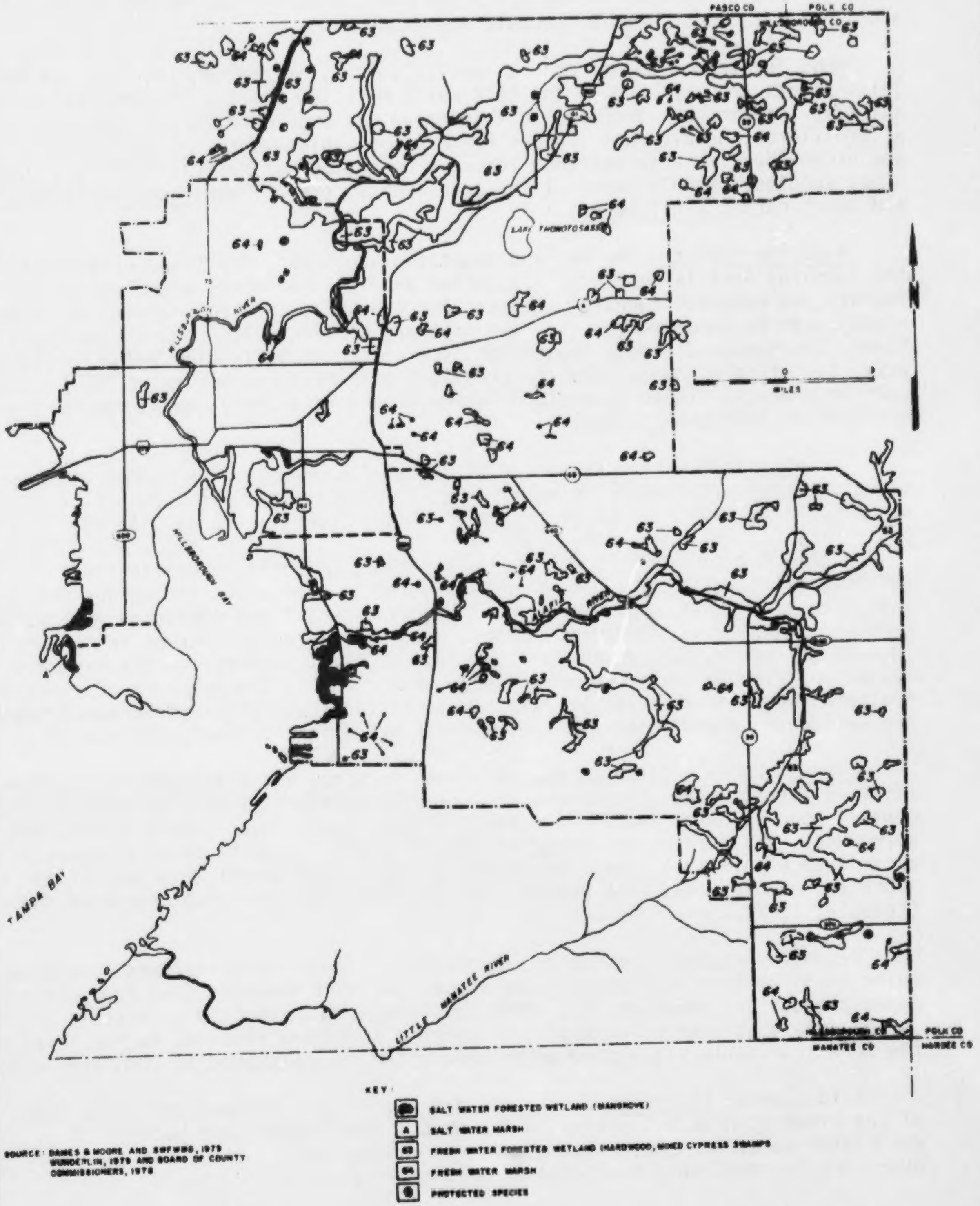
FIGURE IV-14


PASCO CO
POLK CO
HILLSBOROUGH CO
LAKE THONOTOSASSA
HILLSBOROUGH RIVER
HILLSBOROUGH BAY
ALAFIA RIVER
TAMPA BAY
LITTLE MANATEE RIVER
MILES
HILLSBOROUGH CO
POLK CO
MANATEE CO
HARDEE CO
63
64
KEY:
SALT WATER FORESTED WETLAND (MANGROVE)
A SALT WATER MARSH
63 FRESH WATER FORESTED WETLAND (HARDWOOD, MIXED CYPRESS SWAMPS
64 FRESH WATER MARSH
PROTECTED SPECIES

SOURCE: DAMES & MOORE AND SWFWMD, 1979
WUNDERLIN, 1979 AND BOARD OF COUNTY
COMMISSIONERS, 1978

*NOTE TO BE USED IN CONJUCTION WITH VEGETATIVE COMMUNITIES MAP

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EPA No. C120634010

WETLANDS AREAS*

DAMES & MOORE

FIGURE IV-15

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although shading effects by the mangroves have probably limited any extensive growth of salt marsh species beneath the canopy.

Most indigenous plants cannot survive salinities approaching pure sea water. These plants are replaced in the salt marsh by a few species (halophytes) with high salinity tolerances. Included in this group are smooth cordgrass (Spartina alterniflora), needle rush (Juncus roemerianus), glasswort (Salicornia sp.), and sea oxeye (Borrichia frutescens) (Georgia Department of Natural Resources, 1975). Other species commonly found in the area are key grass (Monanthochloe littoralis), and beach carpet (Philoxerus).

Riverine Forest - The wetland vegetation following the major river systems in the Planning Area is generally classified as riverine forest comprised of cypress forests and hardwood forests. Streams and creeks in the south are lined predominantly with hardwood forest. In the northern portion, along the Hillsborough River, the hardwood forest vegetation type is particularly rich and extensive. Here, the mixed hardwood swamp is prevalent with bald cypress being the predominant conifer species. These bottomland hardwoods are relatively undisturbed and offer wildlife an important refuge.

Included in the riverine areas of Hillsborough County are common occurrences of bald cypress stands. Pure stands are almost even-aged, as a result of clearing, and succession from a single or a few seedlings (Cowell, et. al., 1976).

Within the hardwood forest vegetation type, periodic inundation is characteristic, with standing water persisting in many areas throughout the year. This forest community may also contain bayheads, which are dominated by low, much branched trees (e.g., redbay, sweetbay, and loblolly bay). Shrubs in this habitat include gallberry, fetter bush and wax myrtle. Many portions of the hardwood swamps may also be termed mixed hardwood swamps due to the presence of cypress, southern red cedar and cabbage palm. Most of the trees in mixed hardwood swamps are deciduous, whereas the bayheads support predominantly evergreen species.

Cypress Domes - Isolated cypress domes or heads occur sporadically within the riverine forest areas. A cypress dome usually consists of very moist soil or a central pond of water where the tallest cypress trees grow. These cypress are surrounded by a peripheral fringe of smaller trees. Cypress domes or cypress heads constitute a relatively small percentage of the total forest type but are an important successional link between the flatwoods and the climax hardwood hammock (Laessle, 1942).

Recently, extensive ditching, draining, and clearing operations have been going on in cypress head areas. The demand for more forested land for pulp and paper production, pastures, and urban development has resulted in drastic changes in the area's ecology. The drying of cypress domes has resulted in the invasion of the more profitable slash pine where deep water once excluded it (Edmisten, 1963).

Bald cypress (Taxodium distichum) domes are very abundant in the northern half of the Planning Area but sparse in the south. Some domes have pockets of associated hardwood species (sweetgum, red maple, water tupelo) but generally the overstory is completely dominated by bald cypress.

Freshwater Marsh - This wetland type occurs throughout the Planning Area with the majority of the marshes dotting the northern half of the Planning Area. Many of these marshes are small but they have a high habitat value as a result of their total productivity. Common throughout these marshes are pickerelweed (Pontederia cordata), smartweed (Polyganum spp.), reed (Juncus spp.), maidencane (Panicum heritomon), arrowhead (Sagittaris spp.), and numerous other hydrophytic species.

Pine Flatwoods - The pine flatwoods vegetation, which may be the most extensive vegetation type in Hillsborough County, is an open forest of pine and cabbage palm, saw palmetto, and scattered hardwood shrubs and trees, with grasses usually the dominant ground cover. This flatwoods vegetation occurs on broad, flat plains of slightly higher elevation than the cypress dome communities or freshwater swamps, although these latter two communities may be interspersed within flatwoods.

The tree flora of the flatwoods are principally slash pine or longleaf pine. The longleaf pine dominates the drier sites and forms a transition linking the pine oak sandhills type with the continuous wetter flatwoods.

Pine Scrub Oak Sandhills - The dryer pine flatwoods (pine sandhills) areas in west central Florida exhibit sites suitable for the development of the sand pine (Pinus clausa) scrub association, although this is not a predominant vegetation type in Hillsborough County (Lakela and Long, 1970). These associations occupy deep, upland soils and low fertility that are characteristically xeric, sloping and acid. The most common oaks are turkey oak (Quercus laevia), live oak, sand post oak (Quercus margaretta), and occasional bluejack oak (Quercus incana). Other shrubs and trees include occasional slash pine, persimmon (Diospyros ebenaster), and Hawthorn (Crataegus spp.).

Old Field - The successional trends of old fields are strongly influenced by external influences. An old field is a seral stage of either primary or secondary succession. In primary succession, old fields represent water bodies which, through natural processes of aging and deposition of organic material, became marsh, prairie, and eventually old field. More commonly, secondary succession occurs, in which an abandoned agricultural field, pasture or barren land has been invaded by forb species to become an old field.

Common components of old field communities include broomsedge, ragweed, horseweed, pigweed and dog fennel. This vegetation type comprises the major open field vegetation type of Hillsborough County, although recent urbanization and agricultural activity has reduced its area.

Fauna

The Planning Area contains a wide variety of fauna. Some of the more common species are discussed in the following. Detailed lists are presented in Technical Reference Document, Volume I, Existing Environment.

Amphibians and Reptiles - Portions of the Planning Area provide valuable habitat for many species of amphibians and reptiles. The herpetofauna (amphibians and reptiles) of Florida are well documented in the works of Carr and Goin (1955) and species lists are available for portions of Hillsborough County. A total of 179 amphibian and reptile species occur in Florida and over 80 of these species are documented as occurring in the Planning Area.

Birds - The diverse habitats available in the Tampa Bay Region attract many different bird species. There are over 230 bird species known to occur in the Tampa Bay area. The salt and freshwater marshes support resident shorebirds and wading birds which are joined by multitudes of migratory waterfowl during the fall and spring seasons. Many of these migratory species winter in the area. The upland habitats support many types of birds, depending on the dominant vegetation.

Migratory species, such as warblers, thrushes and doves also augment the resident populations in these areas.

Mammals - There are over 40 species of mammals documented as occurring in the Planning Area. The majority of these mammals are secretive or nocturnal and thus are rarely seen. Rodents and bats account for a large portion of the mammal density in the area. Mammals considered as game animals include squirrels, rabbits, deer and pigs. Others which are trapped primarily for fur, include the fox, skunk, bobcat, opossum, raccoon, otter and nutria.

10. AQUATIC ECOLOGY

The existing freshwater and estuarine environments of the Planning Area include the following ecosystems:

- Freshwater - lakes, ponds and streams.
- Estuarine - Regions along the marine/freshwater interface near the mouth of rivers and the Hillsborough Bay, McKay Bay, Old Tampa Bay and Upper Tampa Bay ecosystems.

Biological data are generally available only for major aquatic ecosystems in the Planning Area. The biological data available for many of these ecosystems are not always recent and some of the areas referenced may have been dramatically altered by societal development or industrial and domestic pollution since the referenced system was last investigated. The available biological data is summarized in Technical Reference Document, Volume 1, Existing Environment.

11. RARE AND ENDANGERED SPECIES

The Planning Area provides habitats suitable for a number of threatened or endangered species. Included in the categories of endangered, threatened, rare and species of special concern are 53 vertebrate species in the Planning Area including eight mammals, 34 birds, 10 reptiles, and 1 amphibian (Table IV-5). This list represents 64 percent of the species listed for the State of Florida.

In 1973, the United States Congress passed the "Endangered Species Act" (Public Law 93-205). This bill acknowledged the impact of human activity upon native wildlife. Conservation policy and the mechanics for management review were outlined in this legislation. Many states followed suit with similar legislation directed at preserving indigenous flora and fauna. In 1974, the Florida Game and Fresh Water Fish Commission (FG&FWFC) adopted a resolution by which the commission staff was directed to provide the public with a listing of those species in the state deserving special conservation consideration and a preliminary listing of 34 species was developed by the FG&FWFC staff. Florida's "Endangered Species Act of 1977", included in its provisions the creation of an Endangered and Threatened Species Advisory Council to investigate and review the program and to make recommendations to the FG&FWFC. Subsequently, the Florida Committee on Rare and Endangered Plants and Animals (FCREPA) was convened. In late 1978, a four volume reference series was published for the FG&FWFC, cosponsored by the Florida Audubon Society and the Florida Defenders of the Environment.

Threatened and endangered mammals within the Planning Area (exclusive of the cetaceans) are found in all of the major terrestrial habitats. However, these species are characteristically restricted to certain habitat types, such as wetlands (Layne, 1978). The Florida Panther (Felis concolor, endangered) is

TABLE IV-5

THREATENED AND ENDANGERED ANIMALS OF THE STUDY AREA

	Status		
Species	US[a]	Fla.[b]	FCREPA[c]
Amphibians			
Florida gopher frog		T[b]	T
Reptiles			
American alligator	E[e] & T		
Suwannee cooter		T	T
Gopher tortoise		T	T
Eastern indigo snake	T	T	SC
Atlantic ridley turtle	E	E	E
Short-tailed snake		E	E
Atlantic leatherback turtle	E		R
Birds			
Wood ibis		E	E
Southern bald eagle	E	T	T
Osprey		T	T
Peregrine falcon	E	E	E
Audubon's caracara		T	T
Southeastern American kestrel		T	T
Florida sandhill crane		T	T
Snowy plover		E	E
Least tern		T	T
Brown pelican	E	E	E
Magnificant frigate-bird		T	T
Ivory billed woodpecker			R
Reddish egret			R
Roseate spoonbill			R
Short-tailed hawk			R
Great-white heron			SC
Great egret			SC
Little blue heron			SC
Snowy egret			SC
Louisiana heron			SC
Black-crowned night heron			SC
Yellow crowned night heron			SC
White ibis			SC
Cooper's hawk			SC
Limpkin			SC
American avocet			SC
Royal tern			SC
Caspian tern			SC
Black skimmer			SC
Florida burrowing owl			SC

TABLE IV-5 (Cont'd)

THREATENED AND ENDANGERED ANIMALS OF THE STUDY AREA

Species	Status		
	US[a]	Fla.[b]	FCREPA[c]
Southern hairy woodpecker			SC
Marian's marsh wren			SC
Eastern least bittern			SC
Mammals			
Florida mouse		T	T
Sherman's fox squirrel		T	T
Florida panther	E	E	E
Florida manatee	E	T	T
Southeastern shrew			R
Big brown bat			R
Southeastern big-eared bat			R
Florida weasel			R
Round-tailed muskrat			SC

---

a = Federal list.
b = Florida Game & Freshwater Fish Commission.
c = Florida Committee on Rare & Endangered Plants and Animals.
d = Threatened.
e = Endangered.
f = Species of special concern.

considered as one of the less restricted mammals known to inhabitat the study area. This panther requires large tracts of relatively undisturbed mixed vegetation types, and frequents swamps, marshlands and woodlands feeding on deer and small mammals. As a predator, the Florida Panther has been considered an enemy of man and has been hunted in the past (Williams, 1978).

Birds are the most numerous species listed in the various conservation categories. More is known about avifauna in general than about other animals because of the more conspicuous nature of birds and the abundance and diversity of bird species found within the various habitats. Many birds are restricted to particular habitat types and/or feeding or breeding requirements, so they are understandably listed as warranting special attention. As noted by Woolfenden (1966, 1974), wintering and winter breeding populations of birds in Florida are many times more diverse and numerous than resident breeding populations. Additionally, remnant populations of what were originally western (continental U.S.) prairie and scrub species occur in the Planning Area. These species include the Audubon's Cracara (*Cracara cheriway*, threatened), the White-tailed Kite (*Elanus caereleus*, rare), the Short-tailed Hawk (*Bluteo brachyrus*, rare) and the Florida Burrowing owl (*Athena cunicularia floridiana*, special concern).

The Southern Bald Eagle (*Haleaeetus leucocephalus*, threatened) and the Fish Hawk or Osprey (*Pandion halioetus*, threatened) both occur and nest within the Planning Area. These raptors occur more abundantly in Florida terrain than in other stretches of their respective historical ranges. However, habitat alterations and impacts from accumulated pesticide residues in these predators' food chains threatens the continued survival of both of these species.

Several of the marsh dependent species, e.g., limpkins, herons and egrets, are listed as species of special concern because of societal impacts on wetlands. Many bird species are listed as Status Undetermined by the FCREPA or are "Blue Listed" by the Florida Audubon Society (FAS) due to the lack of supportive data with which more reliable decisions toward status and possible management criteria might be developed.

The only amphibian listed within the Planning Area is the Florida Gopher Frog (*Rana areoata*, threatened). This small frog is known to inhabitat stump holes and crawfish burrows but more often is associated with the burrow of its namesake, the Florida Gopher Tortoise (*Gopherus polyphemus*, threatened). Those impacts that are deleterious to the fate of the Gopher Tortoise are also believed to adversely affect the Gopher frog.

Threatened and endangered species of reptiles within the Planning Area include the Florida Gopher Tortoise, the Florida Scrub Lizard (*Sceloporus woodi*, rare) and the Eastern Indigo Snake (*Drymarchon corais*, special concern).

The burrowing Florida Gopher Tortoise is a threatened species and also provides ecologically significant habitat to numerous other commensal inhabitants (Affenberg, 1978). Some of the more important vertebrates found in association with the Gopher Tortoise are the Florida Pine Snake (*Pituophis melanoleucus*), the Eastern Indigo Snake, the Florida Mouse (*Peromyscus floridanus*) and the Florida Gopher Frog. Considered a delicacy, the Florida Gopher Tortoise has been hunted and depleted from most of its historical native range. This has resulted in placing the Gopher Tortoise in lists for official conservation status and as an official game species, simultaneously. Habitat alteration by general development in well-drained, sandy ridge areas has also led to the decline of these populations. Relatively slow reproductive rates complicate efforts to relocate and to restore the Gopher Tortoise to tracts of suitable habitat.

The Eastern Indigo Snake is a regular inhabitant of both moist hammocks and pine flatwoods. The range of the indigo snake extends into the sandhill habitats and into ecotones around recently logged forest areas in association with the Gopher Tortoise. The burrow of the Gopher Tortoise provides for the cooler, moist atmosphere the Indigo requires. The Indigo's attractive appearance and mild temperment have made this species a collection target for the pet trade. Recommendations for enhancing Indigo populations include safeguarding the xeric hammock communities that the snake inhabits, enforcement of prohibition on collection and handling specimens, and protection for the Gopher Tortoise (Kockman, 1978).

PART C: EXISTING MAN-MADE ENVIRONMENT

1. POPULATION CHARACTERISTICS

The Tampa Bay Region, consisting of Hillsborough County, Manatee County, Pasco County and Pinellas County, has grown very rapidly since 1950. This growth, which exceeds national growth by as much as 22 percent, is due primarily to in-migration. The Tampa Bay Region has been and is continuing to expand rapidly. Hillsborough County, which is in the center of the Tampa Bay Region, has followed regional growth. From 1950 to 1960 Hillsborough County expanded by 59 percent and in the following decade, it expanded by 23 percent. Population is presently expanding at a rate of 76 percent per decade.

The primary reasons for the large population growth in the area are: the migration of large numbers of retired and semi-retired people from the northern portions of the United States; and, the industrial and commercial enterprises coming into the area. Both of these reasons are a result of the pleasant and agreeable climate characteristics of west-central Florida.

This growth rate is expected to remain high. Population projections contained in the 201 Facilities Plan, Study Memorandum No. 1, Study Areas and Population, are shown in Table IV-6.

2. LAND USE

The Planning Area's land use patterns have been strongly influenced by the high growth experienced since 1950 which has made large scale residential development projects economically feasible. In the Planning Area such development has resulted in suburban sprawl.

Urban development in 1948 was centered north of Hillsborough Bay in the vicinity of what is at present the Central Business District (CBD) of Tampa. Between 1948 and 1972 urban development in Hillsborough County had more than doubled and had spread outward from the existing city core. Thus, the main development occurred north, southwest and east of its original location. Between 1972 and 1976 development occurred around the existing urban perimeter and showed definite trends of advancing northward and eastward of its present limits. Advancement of urban development from the original city areas has been a process of outlying areas developing in isolation from existing urban development with subsequent development filling in the vacant areas. The trend seems to have accelerated between 1972 and 1976 since, in relation to past development, more areas were developed, and in general, these were further from the existing urban area of the city.

TABLE IV-6

POPULATION PROJECTIONS
CENTRAL HILLSBOROUGH COUNTY - TAMPA 201 PLANNING AREA

Area	1980	1990	2000	2010	2010
Tampa Service Area	410,209	476,606	543,000	609,402	675,799
County Service Area	106,730	150,120	193,500	236,880	280,270
TOTAL	516,939	626,726	736,500	846,282	956,069

Areas of predominately non-farm occupance, which include areas of commuter's residences, extend far beyond the city itself. The outer edge of the city is a wide zone of transition from areas that are solidly urban to more widely separated homes and subdivisions. Since more land is available for subdivisions than demanded, their specific location is random, based on complicated factors inherent in a speculative free land market.

The Planning Area covers an area of approximately 419,840 acres. In 1976, approximately 24 percent of the Planning Area was in urban development. The remainder of the area was in rural or preservation areas. Of the 99,240 acres of urban land in the Planning Area, 61 percent was in intensive urban uses or heavy industry. Seventeen percent of the Planning Area was in moderate urban uses or in transition to intensive urban usage. The remaining 21 percent of the area was in suburban-type development. Thus, the most common land use in the urban area is intensive and highly developed in nature. Figure IV-16 illustrates the location of these urban land types within the Planning Area.

Predicted land use in the Planning Area for the year 2000 is shown in Figure IV-17. By the year 2000 urban land is predicted to compose more than 45 percent of the total Planning Area. Most of the land classified as urban will be intensively developed. This intensively developed land will occupy almost 19 percent of the total Planning Area and account for over 40 percent of all urban land usage in the Planning Area. During this period, urban transition land and suburban land is going to increase on the order of 185 percent, much greater than intensively used urban level.

3. ECONOMIC CONDITIONS

The City of Tampa and Hillsborough County's economic structure is based upon contract construction, transportation and wholesale and retail trade. While Hillsborough County is a major metropolitan area, its economic importance is established through its relationship to the Tampa Bay Region.

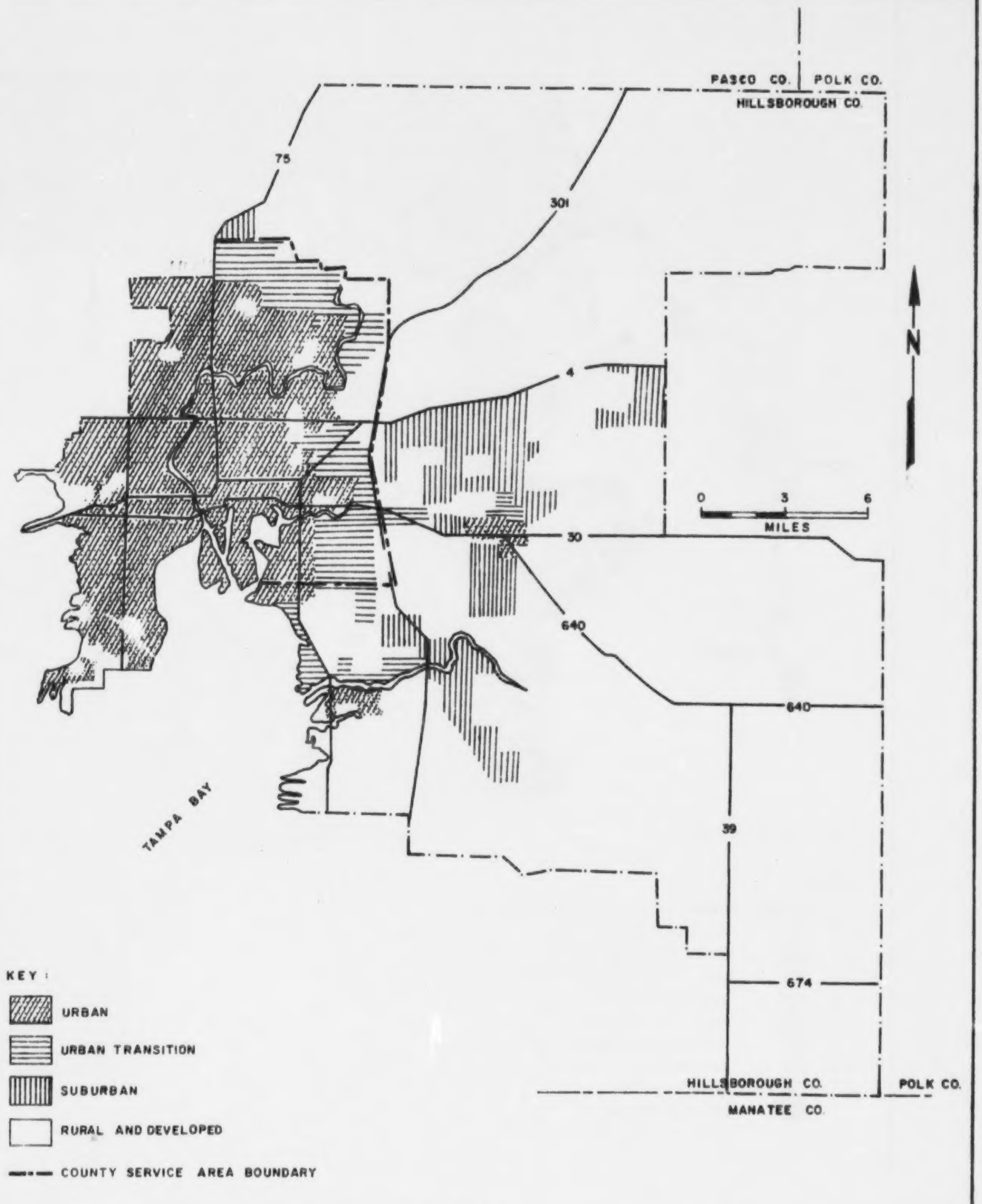
Tampa is a trade center for the region. It is a leading phosphate shipping port and is involved with citrus canning as well as a shrimp industry. Manufactured products include fabricated steel, electronic equipment, cigars, beer, paint and fertilizers. It is also an education center with the University of South Florida, the University of Tampa, Hillsborough Community College and Florida College. This variety allows a diverse employment structure; the Tampa/Hillsborough economy is the most diverse in the Planning Area.

Employment

Employment in Hillsborough County may be classified into one of three groups: manufacturing industries, nonmanufacturing industries and agricultural enterprises. The majority of the workers in Hillsborough County are employed in nonmanufacturing industries. These include: contract construction; transportation, communication and utilities; trade (wholesale and retail); finance, insurance and real estate; government (civilian only); and, services, mining and miscellaneous.

The largest employers in the county are the city and county governments. Firms or organizations employing over 1,000 persons constitute a small percentage of the total employment. Thus, there are a large number of small firms and organizations which is characteristic of an area dependent upon services or tourism for an economic base.

iv-39


PASCO CO.
POLK CO.
HILLSBOROUGH CO.
75
301
4
30
640
640
39
674
TAMPA BAY
N
0
3
6
MILES
HILLSBOROUGH CO.
POLK CO.
MANATEE CO.
KEY:
▨ URBAN
▤ URBAN TRANSITION
▥ SUBURBAN
☐ RURAL AND DEVELOPED
COUNTY SERVICE AREA BOUNDARY

SOURCE: GREELEY AND HANSEN, AND SMITH AND GILLESPIE, 1979

GENERALIZED LAND USE - YEAR 1976

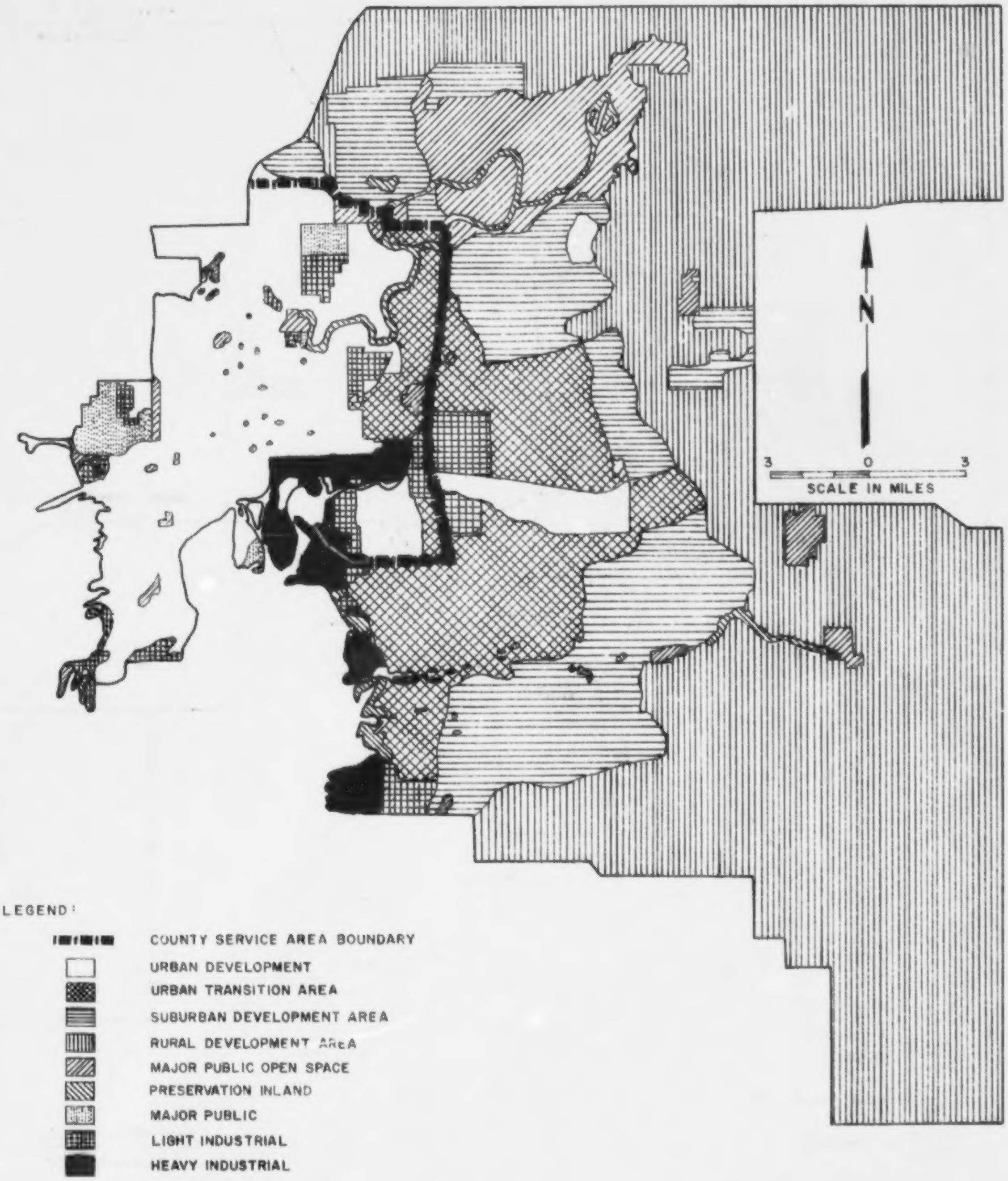
CENTRAL HILLSBOROUGH COUNTY - TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

DAMES & MOORE

FIGURE IV-16

0765601026(9/79)

iv-40


N
3 0 3
SCALE IN MILES
LEGEND:
COUNTY SERVICE AREA BOUNDARY
URBAN DEVELOPMENT
URBAN TRANSITION AREA
SUBURBAN DEVELOPMENT AREA
RURAL DEVELOPMENT AREA
MAJOR PUBLIC OPEN SPACE
PRESERVATION INLAND
MAJOR PUBLIC
LIGHT INDUSTRIAL
HEAVY INDUSTRIAL

SOURCE: HORIZON 2000 PLAN AS INTERPRETED BY SMITH AND GILLESPIE, GREELEY AND HANSEN.

CENTRAL HILLSBOROUGH COUNTY-TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

GENERALIZED LAND USE MAP-YEAR 2000

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FIGURE IV-17

Agriculture has historically been important to Hillsborough County. Hillsborough County is still an exporter of citrus and truck crops. However, the number of farmers and amount of land devoted to agricultural purposes have declined more than 30 percent in the period from 1964 to 1974; a time period in which Hillsborough County experienced rapid growth in population. Unfortunately, much of the growth was at the expense of cropland, particularly citrus groves.

Areas with soils unsuitable for urban development, citrus production and truck farming are shown in Figure IV-18. Areas that have soils suitable for citrus production are, in general, also suitable for septic tank usage and, therefore, urban development. This conflict leads to higher value land uses competing against existing, less profitable land uses. In the past, urban and residential development have proven more attractive than citrus farming. It is likely the urbanization of these citrus producing areas will continue. If the Horizon 2000 Plan is accurate in predicting development patterns, most of the citrus-producing soils in the Planning Area will be urbanized by the year 2000. In addition, citrus areas in the southeastern portion of the Planning Area lie within the phosphate mining district. Existing groves in this area will be removed from production as mining progresses.

The areas suitable for truck farming are generally unsuitable for urban development due to their lower-lying, wetter nature. As a result, urbanization of these areas are not expected to occur as rapidly as in areas suitable for citrus production.

Income

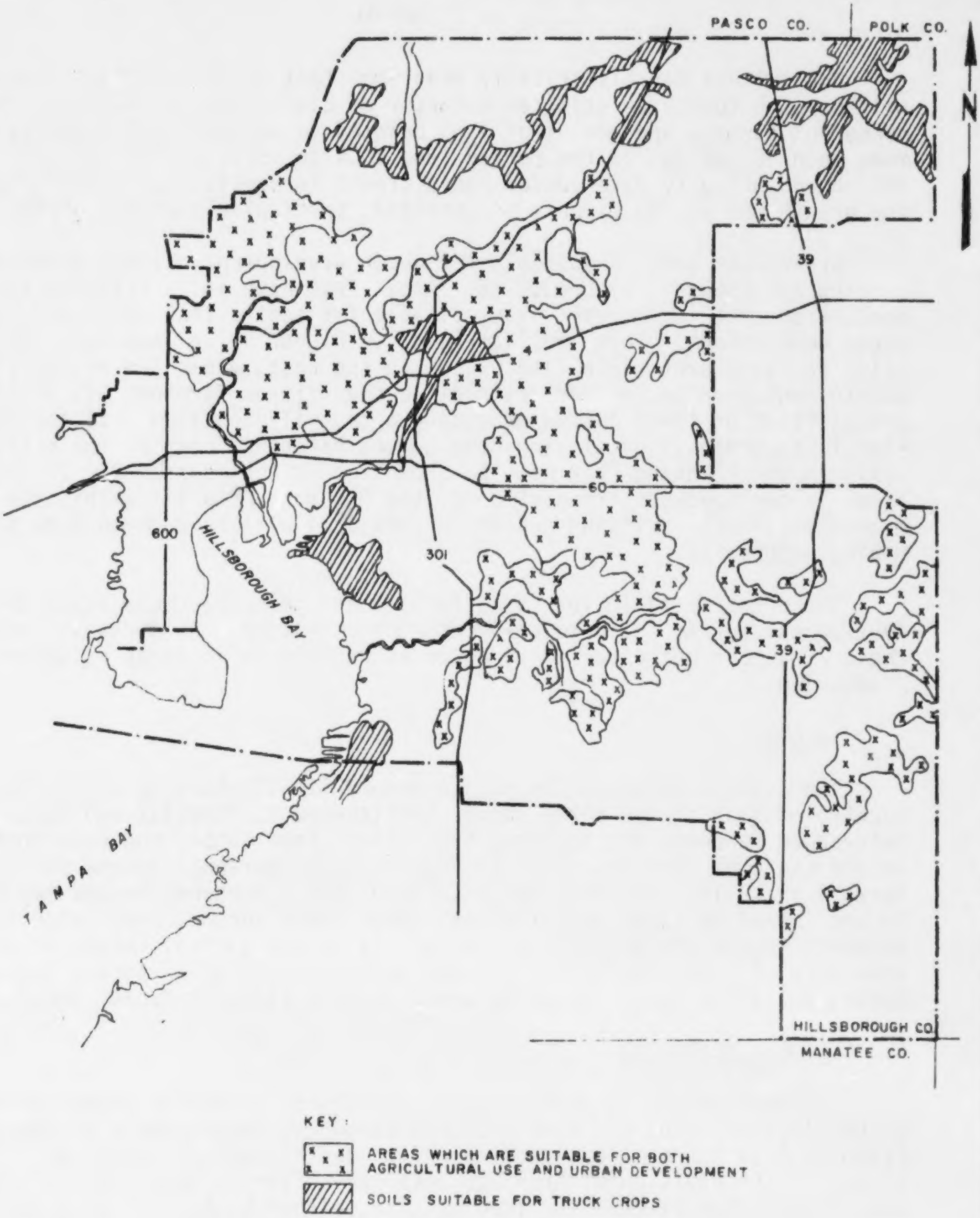
The average personal per capita income in Hillsborough County has closely paralleled that of the three-county (Hillsborough, Pinellas and Pasco) Tampa-St. Petersburg Standard Metropolitan Statistical Area (SMSA) and also that of the entire State of Florida. Seen in Figure IV-19, personal income per capita has taken a sharp increase from about 1965 to 1975. Personal income may be defined as income including wages and salaries, other labor income, proprietor's income, property income and transfer payments. It is the current income of people in an area from all sources, being measured before deduction of income and other personal taxes, but after deduction of personal contributions to social insurance programs.

4. CULTURAL RESOURCES

Cultural resources include both prehistoric resources commonly associated with archaeological sites and with historic resources associated with landmarks. The Planning Area has numerous archaeological and historical resources. The resources listed in the Division of Archives Inventory, Florida Department of State, are mapped on Figure IV-20. The type of site, either historical or archaeological, is indicated, along with the number of sites within the one square mile section of the Inventory Reference number. The results of an archaeological survey performed along much of the proposed pipeline routes are included as Appendix A of Technical Reference Document, Volume II, Alternatives Development and Evaluation.

5. RECREATIONAL RESOURCES

The Planning Area contains numerous lakes, several rivers, one bay and one state park. Hunting, fishing, swimming, camping and hiking are popular within the Planning Area. The Hillsborough River State Park is the major land area set aside for recreation. However, the use of the many lakes scattered throughout the Planning Area for swimming and water skiing should not be underestimated.


PASCO CO.
POLK CO.
N
39
4
60
600
301
HILLSBOROUGH BAY
TAMPA BAY
39
HILLSBOROUGH CO.
MANATEE CO.
KEY:
AREAS WHICH ARE SUITABLE FOR BOTH AGRICULTURAL USE AND URBAN DEVELOPMENT
SOILS SUITABLE FOR TRUCK CROPS

SOURCE: FLORIDA DEPARTMENT OF ADMINISTRATION, 1975

LAND AREAS WHERE URBAN AND AGRICULTURAL DEVELOPMENT CONFLICT

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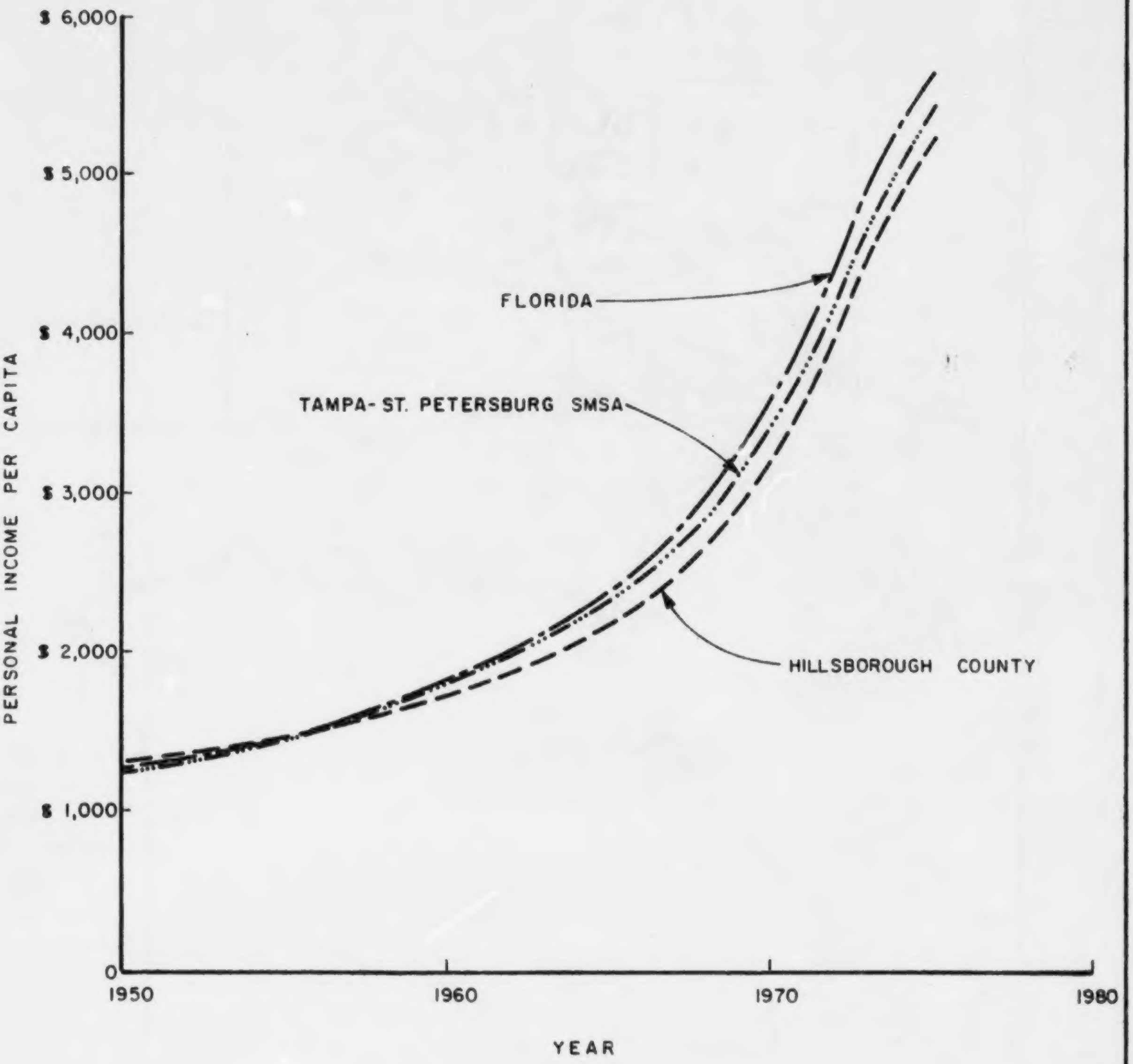
FIGURE IV-18

iv-43



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SOURCE :

SMITH AND GILLESPIE
GREELEY AND HENSEN
ENGINEERS

PERSONAL INCOME PER CAPITA:
1950 - 1975

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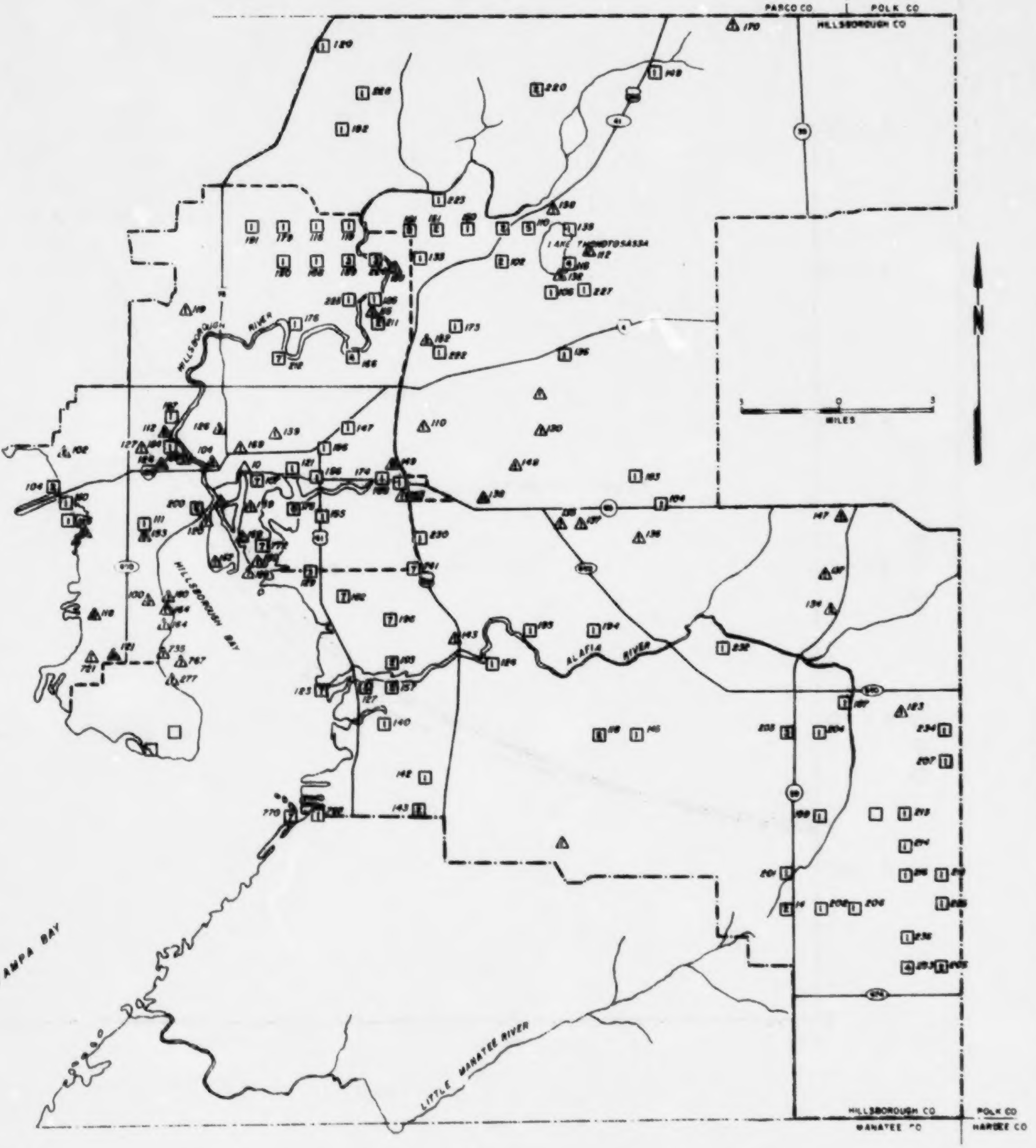
FIGURE IV-19

iv-44


PASCO CO
POLK CO
HILLSBOROUGH CO
LAKE THONOTOSASSA
HILLSBOROUGH RIVER
HILLSBOROUGH BAY
TAMPA BAY
ALAFIA RIVER
LITTLE MANATEE RIVER
MILES
N
HILLSBOROUGH CO
POLK CO
MANATEE CO
HARDEE CO

KEY

△ 136 HISTORICAL SITE, (1) MEANS NO. OF SITES WITHIN SECTION (130) INVENTORY REFERENCE NO.

☐ 236 ARCHEOLOGICAL SITE, (4) MEANS NO. OF SITES WITHIN SECTION (121) INVENTORY REFERENCE NO.

DATA SOURCES: FLORIDA DEPARTMENT OF STATE, DIVISION OF ARCHIVES INVENTORY OF HISTORICAL AND ARCHEOLOGICAL SITES.

CENTRAL HILLSBOROUGH COUNTY-TAMPA
201 FACILITY PLAN
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KNOWN HISTORICAL AND ARCHEOLOGICAL SITES

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FIGURE IV-20

The largest park in the Planning Area is the Hillsborough River State Park. Classified as a park generating regional interest, it consists of 2,964 acres with over 100 spaces available for tent or trailer camping. The park is classified as a developed resource by the Department of Natural Resources and offers picnicking, swimming, fishing, boating and nature trails. For fiscal year 1975-77 the park's cumulative attendance by overnight and day visitors was 276,450 persons.

Other regional parks are located south of Plant City in the vicinity of Durant, Hopewell and Pinecrest. Parks including the smaller urban and neighborhood parks are shown in Figure IV-21.

In addition to the public recreational areas, there are many private areas used for hunting and fishing as well as golf. Tampa Bay is also a source of sport fishing, including the annual Tarpon Tournament of Tampa.

6. TRANSPORTATION

The Planning Area is served by highways, the Port of Tampa, railroads, bus service and air service. Although transportation is a "basic" industry for the Planning Area, only the highway network has particular relevance to the proposed action. The existing highway network has approximately 131 miles of freeway and 1305 miles of collectors and arterials. The system is slated for expansion but the improvements may not be extensive enough to maintain existing service levels for the projected service demands.

The major highways serving the Planning Area are briefly summarized in Table IV-7. Discussions of actual traffic counts and service levels are contained in Technical Reference Document, Volume 1, Existing Environment.

Increased demand on the transportation system may be met by a projected mass transit system. This all bus system is designed to give greater service to transient dependent riders and attract new riders. The system is designed to carry approximately 76,300 persons per day. Figure IV-22 indicates the proposed bus transit plan.

7. RESOURCE USE

As discussed in Section 3 of this part, Hillsborough County is an exporter of citrus and truck crops. Marginal croplands are also used for pasturing primarily hogs and cattle.

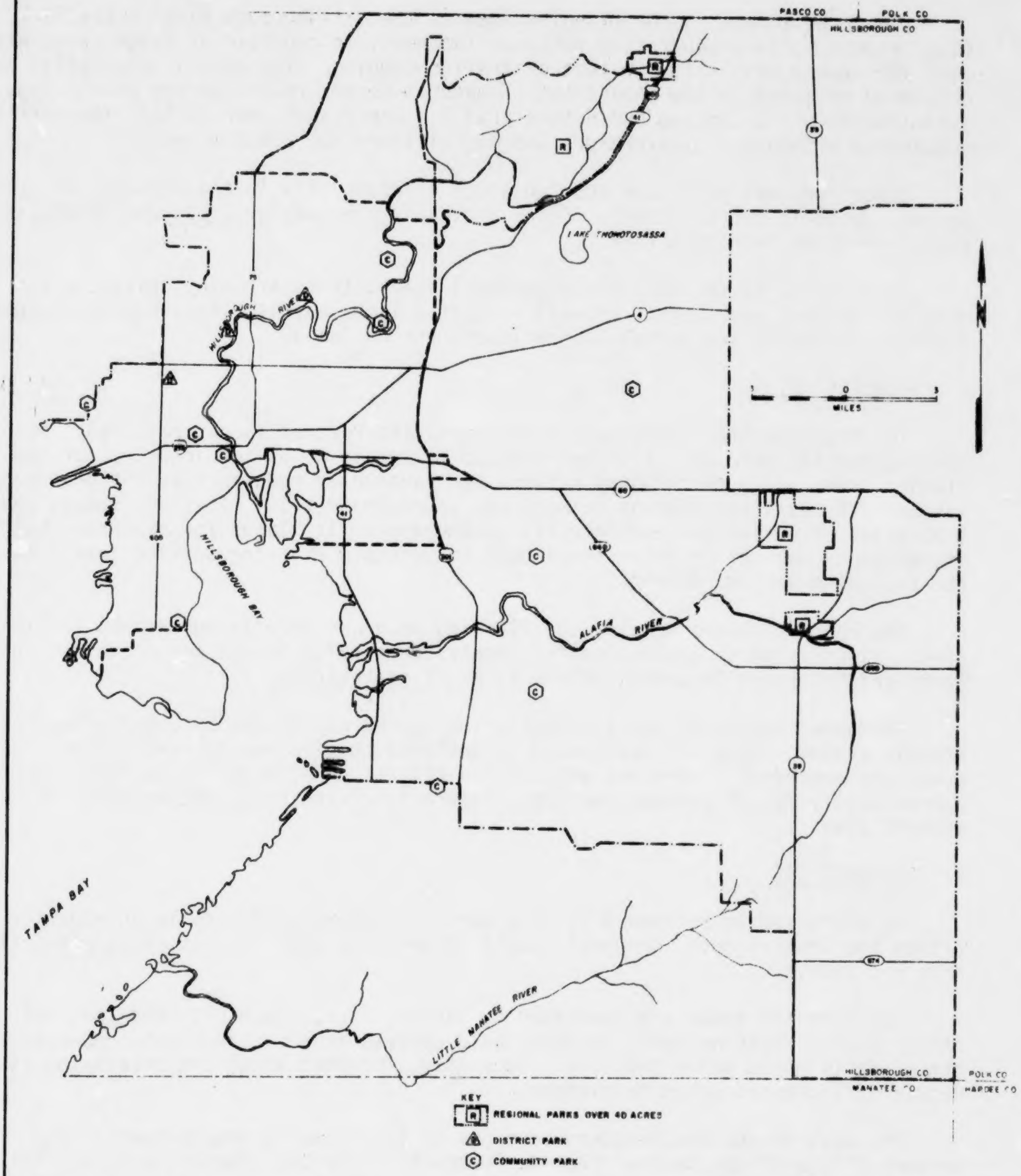
The forested areas are dominated by various oaks, slash pine and longleaf pine. Within riverine swamp forests, bald cypress is also prevalent. However, timbering is not a major industry. Generally, forested areas are decreasing as a result of increased urban development.

The eastern and southeastern portions of the Planning Area border on the western fringe of the Central Florida Phosphate district. Phosphate is actively mined in portions of these areas with future development proposed.

8. WASTEWATER PROGRAMS AND SPECIAL PROBLEMS

The most appropriate method of treatment and disposal of wastewater in the Central Hillsborough County - Tampa 201 Planning Area is the central issue of this environmental impact statement. Within the Planning Area, the only municipal treatment and disposal systems are the Hookers Point facility owned and operated by the City of Tampa, the Brandon Sewer System owned by Hillsborough County, and

iv-46


PASCO CO
POLK CO
HILLSBOROUGH CO
LAKE THONOTOSASSA
HILLSBOROUGH RIVER
HILLSBOROUGH BAY
ALAFIA RIVER
TAMPA BAY
LITTLE MANATEE RIVER
MILES
N
HILLSBOROUGH CO
MANATEE CO
POLK CO
HARDEE CO
KEY
R REGIONAL PARKS OVER 40 ACRES
DISTRICT PARK
C COMMUNITY PARK

DATA SOURCES

1. OUTDOOR RECREATION IN FLORIDA, 1976. STATE OF FLORIDA, DEPT. OF NATURAL RESOURCES DIVISION OF STATE PARKS AND RECREATION
2. ST. PETERSBURG HEALTH DEPARMENT
3. FLORIDA DEPT. TRANSPORTATION AREAS OF ENVIRONMENTAL CONCERN. MAPS FOR PASCO, PINELLAS, HILLSBOROUGH, AND MANATEE COUNTIES

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PLANNING AREA PARKS AND RECREATION AREAS

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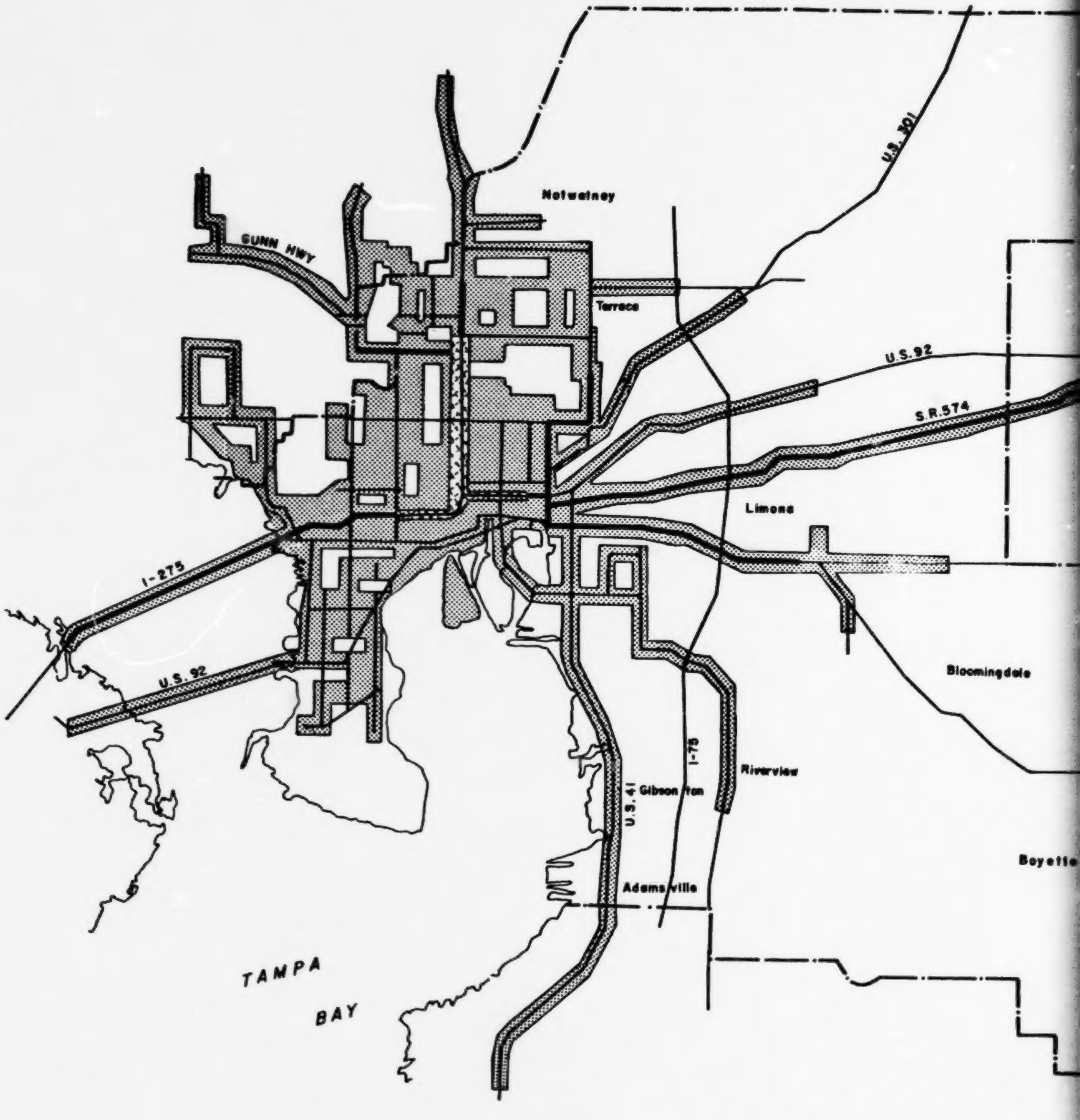
FIGURE IV-21

TABLE IV-7

MAJOR HIGHWAYS
CENTRAL HILLSBOROUGH COUNTY - TAMPA 201 PLANNING AREA

ROAD/HIGHWAY	SERVICE AREA
a. I-4	a. Traverses center of Planning Area in east-west direction, connects Tampa with Orlando and points east.
b. I-75	b. North-south route on western edge of Planning Area, connects Tampa with Ocala and points north.
c. I-275	c. Connects Tampa with St. Petersburg and the beaches to the west.
d. U.S. 92/Florida 600	d. Parallels I-4.
e. U.S. 301/Florida 43	e. North-south highway traversing center of Planning Area serving points north and southern coastal areas.
f. U.S. 41/Florida 45	f. North-south route paralleling coast in southern Planning Area serving Ruskin and southern coastal cities.
g. Florida 60	g. East-west highway traversing center of Planning Area serving Bartow, Lake Wales and Vero Beach.
h. Florida 39	h. North-south route traversing rural portions of eastern Planning Area.
i. Florida 640	i. Highway traverses southeasterly from Brandon, then east in southern portion of Planning Area, accessing center of phosphate mining activities.

iv-48


Notwatney
GUNN HWY
U.S. 301
Terrace
U.S. 92
S.R. 574
Limona
I-275
U.S. 92
Bloomingdale
U.S. 41
Gibsonton
I-75
Riverview
Boyette
Adamsville
TAMPA
BAY

SOURCE : HILLSBOROUGH COUNTY PLANNING COMMISSION

CENTRAL HILLSBOROUGH COUNTY-TAMPA
201 FACILITY PLAN
ENVIRONMENTAL REPORT
EPA No. C120634010

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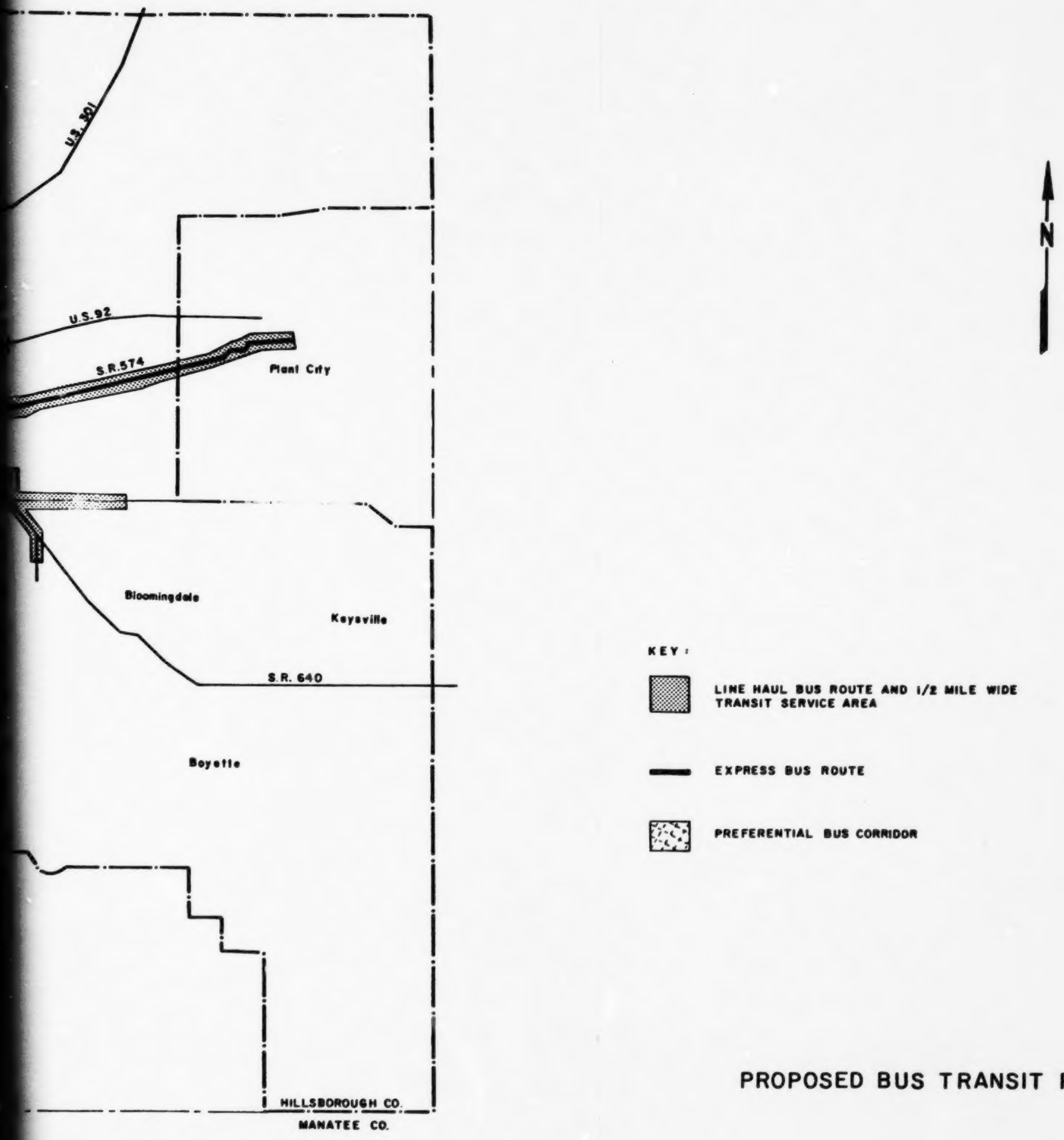

U.S. 301
N
U.S. 92
S.R. 574
Plant City
Bloomingdale
Keysville
S.R. 640
Boyette
HILLSBOROUGH CO.
MANATEE CO.
KEY:
LINE HAUL BUS ROUTE AND 1/2 MILE WIDE TRANSIT SERVICE AREA
EXPRESS BUS ROUTE
PREFERENTIAL BUS CORRIDOR

PROPOSED BUS TRANSIT PLAN

DAMES & MOORE

FIGURE IV - 22

several small package treatment plants owned by Hillsborough County. Besides these public facilities, non-municipal wastewater treatment facilities are scattered throughout the Planning Area. These facilities generally consist primarily of small collection systems with package treatment plants using percolation ponds as the method of disposal. In addition, individual on-lot systems, primarily septic tank and drain fields, are used extensively, especially within the County Study Area. Figure IV-23 shows the location of facilities which are existing or under construction in the Planning Area.

The following summarizes the existing facilities, performance of the existing facilities and wastewater projections by service area. Detailed discussions of existing facilities are included in the 201 Facilities Plan, Study Memorandum No. 6, Existing Facilities. Detailed discussions of wastewater projections are included in Study Memorandum No. 3, Wastewater Quantities and Characteristics.

Tampa Service Area (TSA)

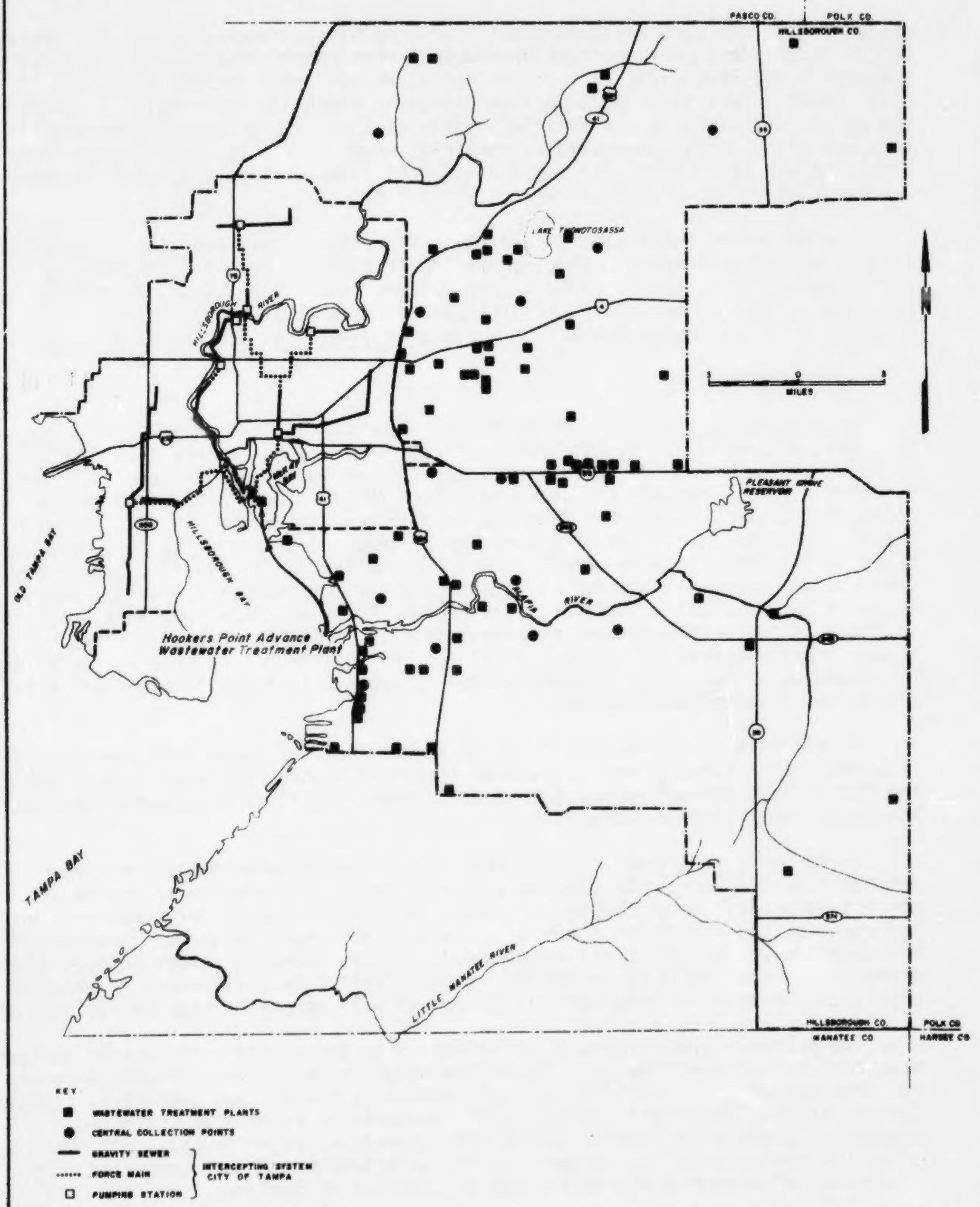
Wastewater Facilities - Approximately 60 percent of the entire TSA is served by sanitary sewers. It is estimated that there are approximately 14,000 septic tanks in the service area which, in general, serve individual residences. The existing sewerage systems are shown on Figure IV-24. The sanitary wastewater collection system is separate from the storm water collection system. As shown, the service area is divided into a number of sewer districts which were developed based on the physical arrangement of existing collection facilities, topography, land use and political boundaries. Collection systems comprise gravity sewers, force mains and pumping stations. The Hookers Point AWT Plant operated by the City of Tampa is the only permanent treatment facility. The AWT Plant is rated for an annual average hydraulic capacity of 60 mgd and is arranged to provide for removal of suspended solids, BOD_5, phosphorus and nitrogen. Effluent from the AWT works is discharged into Hillsborough Bay.

In addition to the Hookers Point treatment facility, many small wastewater treatment facilities, primarily package treatment plants, are used in portions of the TSA to meet current wastewater needs. These facilities are located on Figure IV-24 and summarized in Table IV-8.

Performance of System - The collection and transmission system requires substantial improvements to provide hydraulic relief for overloaded sewers and to correct structural deterioration of sewers that are no longer serviceable or where hydrogen sulfide attack has occurred. Projects now under construction or planned will provide the hydraulic relief necessary in some existing sewers through flow diversion. Other existing sewers will require relief by replacement or parallel pipeline. Sewers with structural deficiencies will generally require replacement.

The hydraulic and structural deficiencies in the existing collection system have resulted in overflows into the Hillsborough River, streets, drainage canals and some bay waters. Additionally, disruptions in service and some local flooding have occurred. These deficiencies cause the periodic release of untreated wastewater from the collection system and, therefore, significantly compromise the effective operation of the system. If the deficiencies are not corrected, such discharges of untreated wastewater may be expected to continue.

The new AWT works are performing satisfactorily and recent effluent results compared to NPDES permit standards are summarized as follows:


PASCO CO.
POLK CO.
HILLSBOROUGH CO.
LAKE THONOTOSASSA
HILLSBOROUGH RIVER
HILLSBOROUGH BAY
OLD TAMPA BAY
TAMPA BAY
Hookers Point Advance Wastewater Treatment Plant
PLEASANT GROVE RESERVOIR
ALAFIA RIVER
LITTLE MANATEE RIVER
3 0 3
MILES
N
HILLSBOROUGH CO.
POLK CO
MANATEE CO
HARDEE CO
KEY
WASTEWATER TREATMENT PLANTS
CENTRAL COLLECTION POINTS
GRAVITY SEWER
FORCE MAIN
PUMPING STATION
INTERCEPTING SYSTEM CITY OF TAMPA

SOURCE GREELEY AND HANSEN, AND SMITH AND GILLESPIE, 1979

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GENERAL LOCATION OF SEWERAGE FACILITIES
EXISTING OR UNDER CONSTRUCTION IN THE
CENTRAL HILLSBOROUGH COUNTY-TAMPA
201 FACILITY PLANNING AREA

FIGURE IV-23

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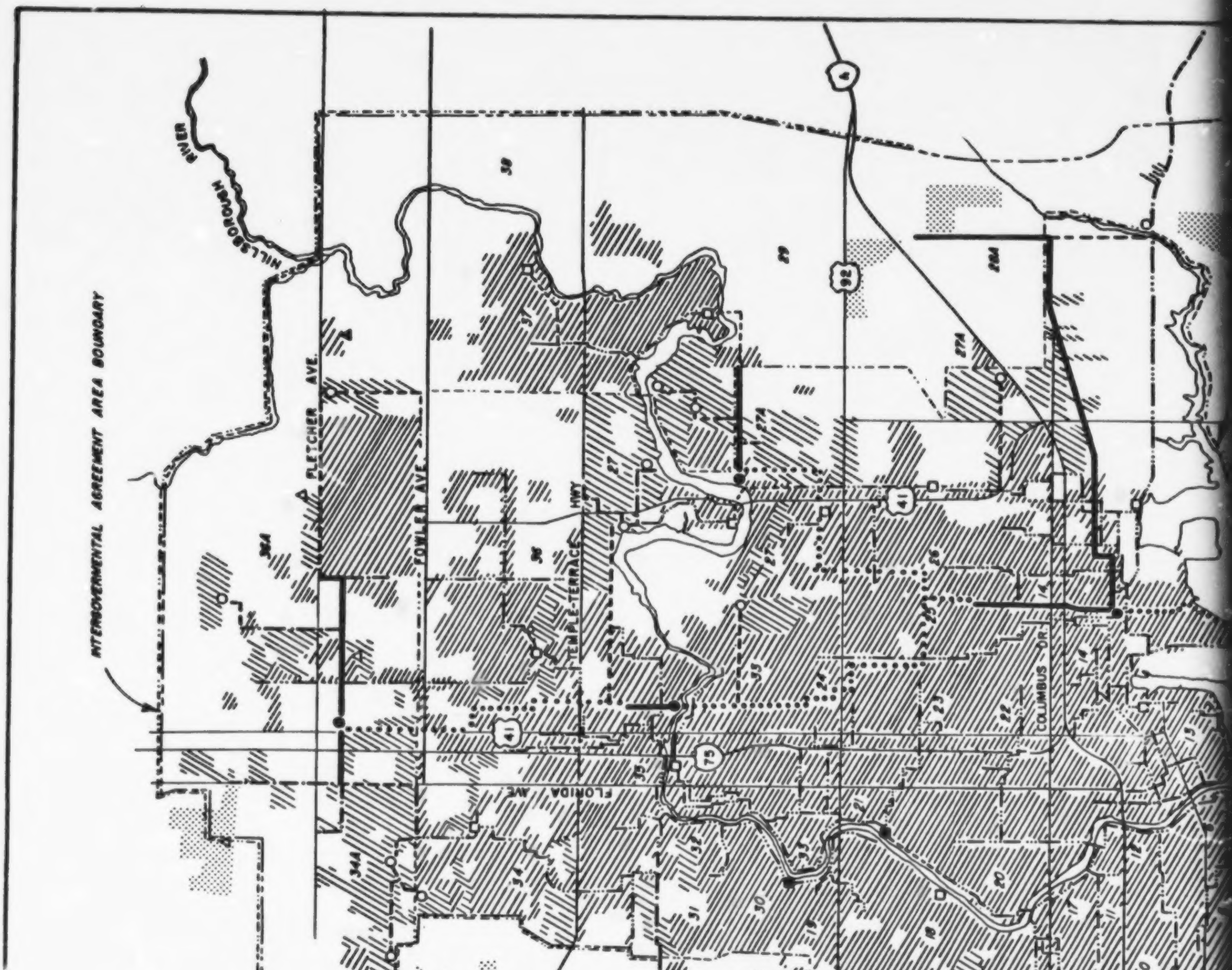
HILLSBOROUGH RIVER
INTERGOVERNMENTAL AGREEMENT AREA BOUNDARY
FLETCHER AVE.
FOWLER AVE.
TEMPLE-TERRACE HWY
FLORIDA AVE
COLUMBUS DR
DALE MABRY HWY
TAMPA CITY LIMITS
TAMPA AIRPORT
41
75
92
60
4

SOURCE : GREELEY AND HANSEN ENGINEERS

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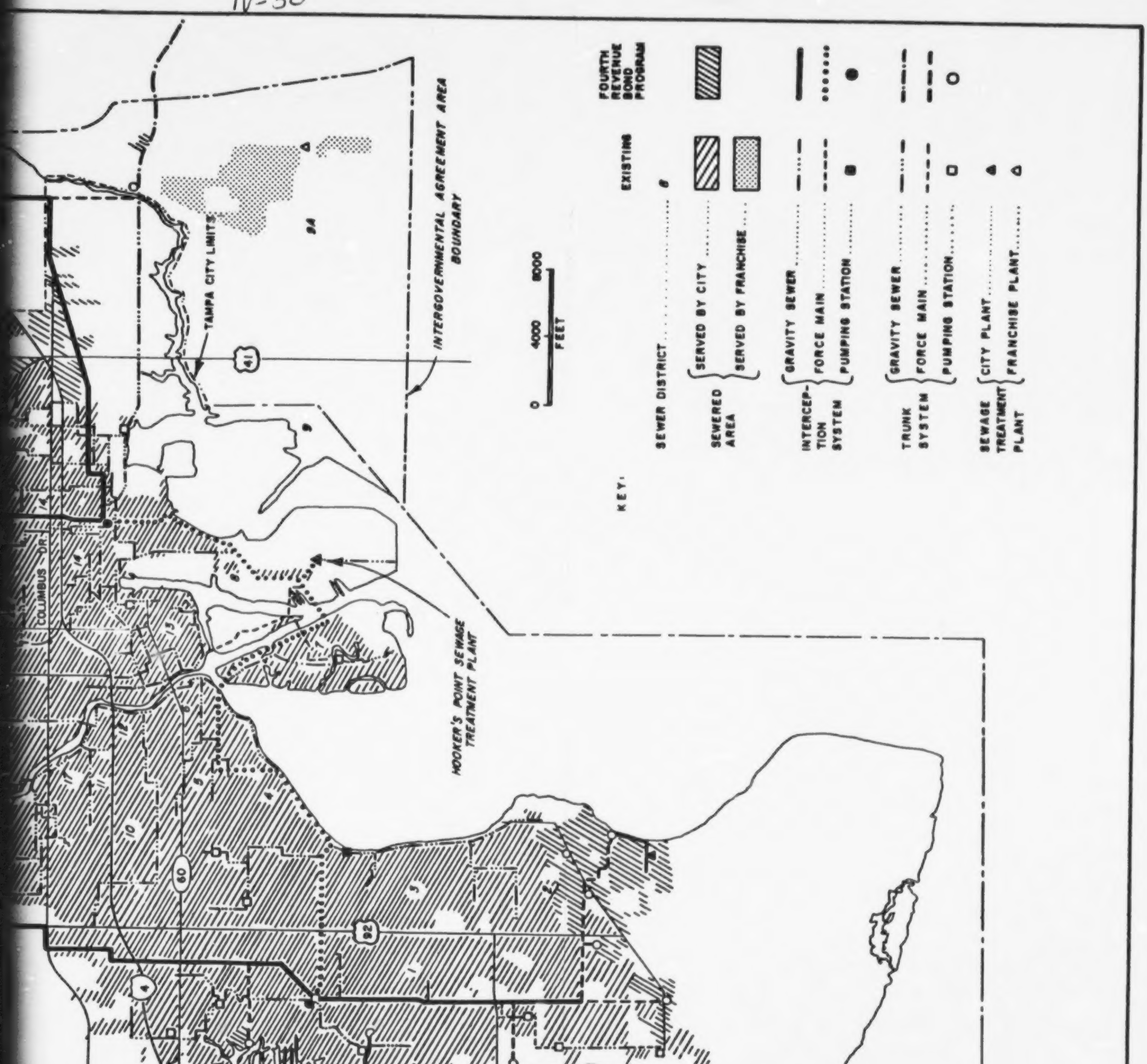

KEY:
EXISTING
FOURTH REVENUE BOND PROGRAM
SEWER DISTRICT
SEWERED AREA
SERVED BY CITY
SERVED BY FRANCHISE
INTERCEPTION SYSTEM
GRAVITY SEWER
FORCE MAIN
PUMPING STATION
TRUNK SYSTEM
GRAVITY SEWER
FORCE MAIN
PUMPING STATION
SEWAGE TREATMENT PLANT
CITY PLANT
FRANCHISE PLANT
0
4000
8000
FEET
TAMPA CITY LIMITS
INTERGOVERNMENTAL AGREEMENT AREA BOUNDARY
HOOKER'S POINT SEWAGE TREATMENT PLANT
COLUMBUS DR.
41
60
92
4
92
9A
9
14
13
10
5
1

SEWERED PARTS OF CITY

DAMES & MOORE

FIGURE IV-24

TABLE IV-8

TAMPA SERVICE AREA EXISTING TEMPORARY WASTEWATER TREATMENT PLANTS

				Wastewater Treatment		
Ref[1] No.	Name	Owner	Service	Type	Cap. (MGD)	Effluent Discharge
1	USF Interim WTP	Tampa	Univ. S. Fla. Area	Sec.	3.500	Spray Irrigation
2	Wildwood Apts.	Private	Apt. Complex	Sec.	0.043	Perc. Pond
3	Bayshore Palms Apts.	Private	Apt. Complex	Sec.	0.010	Tampa Bay
4	Eastlake	East Side Water Co.	Subdivision	Sec.	0.025	Pond & Canal
5	Lakewood Estates	Private	Mobil Home Park	Sec.	0.170	Creek
6	Nebraska Neighbor	Private	Mobil Home Park	Septic Tanks	N/A	Drain Fields
7	Univ. Apartments	Private	Apt. Complex	Sec.	0.015	Perc. Pond
8	Hidden Creek	Private	Mobile Home Park	Sec.	0.010	Spray Irrigation
9	Lamplighter	Private	Mobile Home Park	Sec.	0.060	Perc. Pond
10	Adams Acres	Hillsborough Util. Corp.	Subdivision	Sec.	0.271	Tampa By-Pass Canal
11	Clair Mel	Seaboard Util. Corp.	Subdivision	Sec.	0.820	Spray Irrigation
12	Fla. Industrial Properties	Private	Industrial Complex	Sec.	0.009	Creek
13	Food Fair Store	Private	Comm'l Complex	Sec.	0.003	Perc. Pond
14	Caprice	Private	Mobile Home Park	Septic Tanks	N/A	Drain Fields

Parameter	Effluent Concentrations - mg/l NPDES Permit	 Actual 11 Mo. Average (5-79 thru 3-80)
BOD_5	30	5.6
SS	25	3.1
Total N	5	2.7
Total P (1)	7.5	>7.5

Note: (1) Variance to 7.5 mg/l granted in July, 1979.

Wastewater Flow Projections - Estimates of annual wastewater quantities for the TSA were prepared for several principal categories of contributors including domestic sources, commercial/light industrial development, industrial development, infiltration and other special contributors. Data and estimates from previous studies combined with current information were used to estimate future annual average unit wastewater quantities.

Wastewater quantities from domestic sources were estimated based on daily per capita contributions. Commercial/light industrial development, industrial development and infiltration wastewater quantities were estimated based on daily areal (gallons per acre per day) contributions. Special contributors included the Tampa Central Business District, Tampa International Airport, University of South Florida and Tampa breweries. Wastewater quantities for the special contributors were estimated based on a combination of past studies, current plus design flow rates and per capita contributions.

Future wastewater quantities and characteristics for the TSA are summarized in Table IV-9.

County Service Area (CSA)

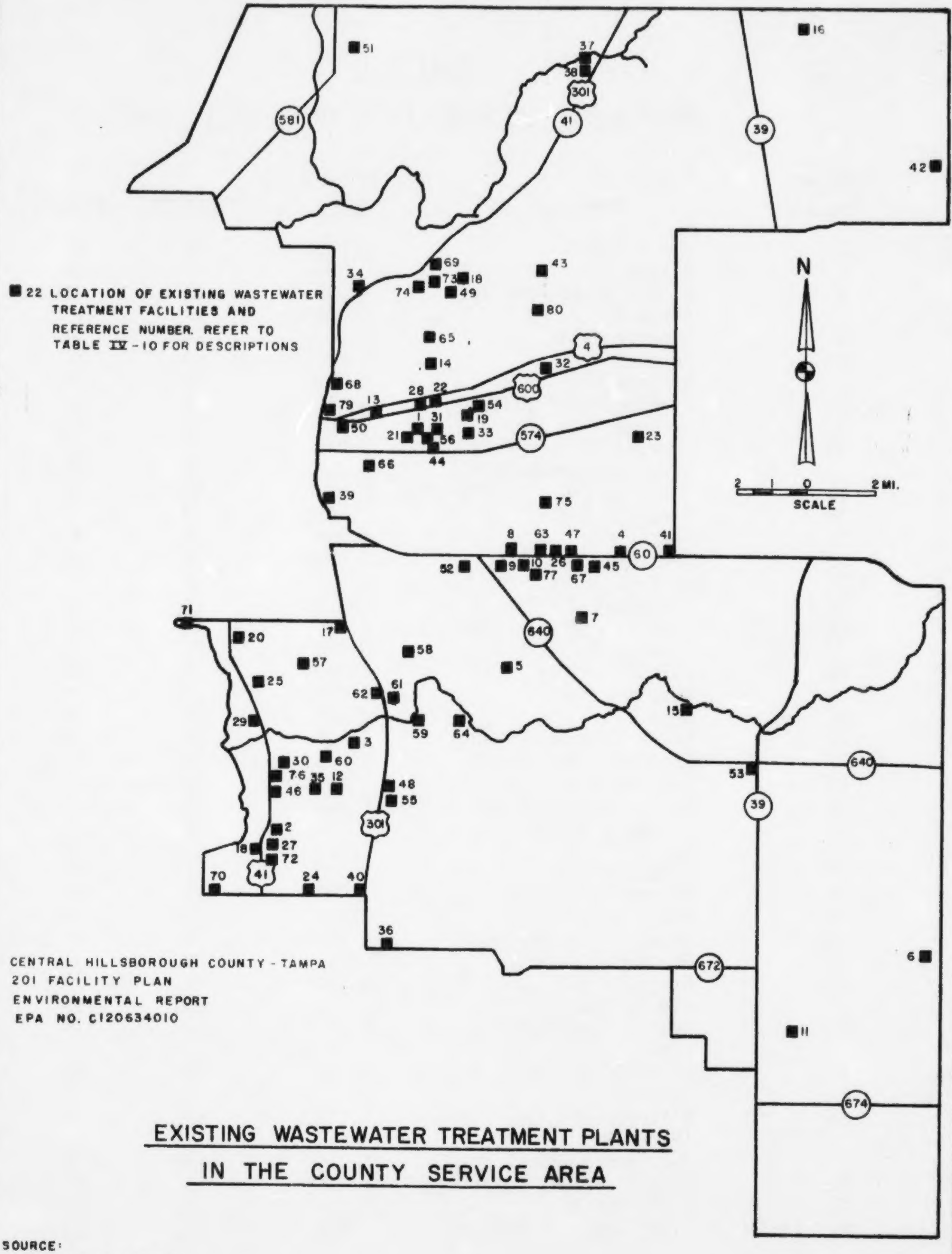
Wastewater Facilities - The CSA is served by septic tanks, package treatment plants, and Hillsborough County's Brandon Sewer System. Septic tanks with drain fields have been used extensively in rural areas and subdivisions. Small package treatment plants have been installed for commercial establishments, apartment complexes, schools, and some subdivisions. There are presently 80 package treatment plants within the CSA. A few of the existing package plants are owned by Hillsborough County; these serve schools, the Seffner Juvenile Home, and four subdivisions. The locations of the existing wastewater treatment plants in the CSA are shown in Figure IV-25. Table IV-10 summarizes the characteristics of these treatment facilities.

The County also owns the Brandon Sewer System. The Brandon Sewer System originated in 1972 when the County purchased the sewerage system serving the Brandon Shopping Center. The package treatment plant was phased out, and the County constructed a gravity interceptor, a master pumping station, and a 16-inch force main to the point of connection with the City of Tampa Sewer System. The Brandon Sewer System has been expanded by allowing new developments to tie in, usually using manifold force mains. The present system includes 46 County-owned pumping stations and several private pumping stations, an extensive network of manifold force mains, and gravity collection systems serving the central Brandon area, subdivisions, apartment complexes and commercial areas.

TABLE IV-9

TAMPA SERVICE AREA SUMMARY - ESTIMATED ANNUAL AVERAGE WASTEWATER QUANTITIES AND CHARACTERISTICS

Item	1978	1980	1985	1990	1995	2000
Populations, 1000's - Total	396.7	410.2	443.4	476.6	509.8	543.0
Sewered	299.8	324.9	387.8	450.7	496.8	543.0
Wastewater Quantities - (MGD)	50.72	55.37	65.62	76.88	86.82	96.44
Suspended Solids (1000 lbs/day)	88.2	99.6	117.2	139.3	152.7	171.5
BOD_5 (1000 lbs/day)	104.3	120.7	139.5	62.9	177.2	197.0
NH_3 (Ammonia Nitrogen)						
a. mg/l	20	20	20	20	20	20
b. 1,000 lbs/day	8.5	9.2	10.9	12.8	14.5	16.1
TKN						
a. mg/l	35	35	35	35	35	35
b. 1000 lbs/day	14.5	16.2	19.2	22.4	25.3	28.2
P (Phosphorus)						
a. mg/l	10	10	10	10	10	10
b. 1000 lbs/day	4.2	4.6	5.5	6.4	7.2	8.0


■ 22 LOCATION OF EXISTING WASTEWATER TREATMENT FACILITIES AND REFERENCE NUMBER. REFER TO TABLE IV-10 FOR DESCRIPTIONS
N
2 1 0 2 MI.
SCALE
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16
37
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672
6
11
674

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EXISTING WASTEWATER TREATMENT PLANTS IN THE COUNTY SERVICE AREA

SOURCE:
SMITH AND GILLESPIE
GREELEY AND HANSEN
ENGINEERS

DAMES & MOORE

FIGURE IV-25

TABLE IV-10

DOMESTIC TREATMENT PLANTS IN THE COUNTY SERVICE AREA

Reference No. 1	Name	Design Capacity MGD	Treatment[2]	Disposal[3]
1	A & A M.H.P.	0.005	EA	PP
2	Alafia M.H.P.	0.020	CS	SW
3	Alafia River Camp Resort	0.020	EA	PP
4	Bargo M.H.P.	0.0085	EA	PP
5	Bloomingdale	0.100	EA	PP
6	Bordens	0.005	EA	R
7	Brandon East S/D	0.0955	EA	PP
8	Brandon Motor Lodge	0.010	EA	PP
9	Brandon Swim Club	0.005	EA	PP
10	Brandon Trailer Park	0.015	EA	PP
11	Brewster Phosphates	0.015	EA	PP
12	Bullfrog Creek Trailer Park	0.010	EA	PP
13	Carousel M.H.P.	0.0055	EA	PP
14	Cast-crete	0.005	EA	R
15	Cedarkirk Camp	0.0074	EA	DF
16	CF Industries	0.015	EA	R
17	Chapparal M.H.P.	0.010	EA	PP
18	Charlie's Trailer Park	0.015	EA	PP
19	Chateau Forest M.H.P.	0.020	EA	PP
20	GAF Corporation	0.003	EA	PP
21	Davpam M.H.P.	0.041	EA	PP
22	Days Inn	0.025	EA	PP
23	Dover Elementary School	0.007	EA	PP
24	East Bay High School	0.045	EA	PP
25	East Bay Raceway	0.0075	EA	PP
26	East Brandon Estates	0.060	CS	PP
27	Eastwood Estates M.H.P.	0.030	EA	PP
28	Ecolo M.H.P.	0.005	EA	PP
29	Gardinier, Inc.	0.010	SF	SW
30	Gibsonton Elementary School	0.0075	EA	PP
31	Grandview M.H.P.	0.020	EA	PP
32	Green Acres Campground	0.045	EA	PP & SI
33	The Groves North	0.090	EA	PP
34	Happy Traveler R.V. Park	0.010	EA	PP
35	Hidden Pine M.H.P.	0.012	EA	PP
36	Hillsborough Correctional Institute	0.040	EA	PP
37	Hillsborough River State Park #1	0.0095	EA	PP
38	Hillsborough River State Park #2	0.015	EA	PP
39	J.L. Rozier Machinery Co.	0.010	EA	PP
40	King Richard's Court M.H.P.	0.025	EA	PP
41	Lee's M.H.P.	0.025	EA	PP
42	Light and Life Camp	0.060	EA	SI

TABLE IV-10 (Cont'd)

DOMESTIC TREATMENT PLANTS IN THE COUNTY SERVICE AREA

Reference No. 1	Name	Design Capacity MGD	Treatment[2]	Disposal[3]
43	Lowe's Nursing Home	0.0175	EA	PP
44	Mango Elementary School	0.0086	EA	PP
45	Mt. Taho Village	0.020	EA	PP
46	Nistal Trailer Park	0.005	EA	SW & PP
47	Oak Hill Mobile Village	0.0156	CS	PP
48	Oakside Trailer Park	0.012	EA	PP
49	Paka Development Corp.	0.022	EA	PP
50	Paradise Village M.H.P.	0.11666	EA	PP
51	Pebble Creek Village	0.100	EA	SI
52	Perkins Pancake & Steak House	0.015	EA	PP
53	Pinecrest Elementary School	0.012	EA	PP
54	Plantation Village M.H.P.	0.01125	EA	SI
55	Pleasant Living M.H.P.	0.013	CS	PP
56	Presidential Manor	0.096	EA	PP
57	Progress Village	0.250	TF	SW
58	Providence Baptist Church	0.0075	EA	DF
59	Riverlawn Trailer Park	0.005	EA	PP
60	Rivershore M.H.P.	0.003	CS	PP
61	Riverview Elementary School	0.0086	EA	PP
62	Riverview Shopping Center	0.010	EA	PP
63	Rolling Hills M.H.P.	0.080	EA	PP
64	Royal Park Arrowhead Campground	0.060	CS	SI
65	Seffner Juvenile Home	0.006	EA	PP
66	Southeast Wire Mfg. Corp.	0.004	EA	R
67	Southern Pines Trailer Park	0.0045	EA	PP
68	Southwest Florida Water Management District	0.003	EA	PP & SI
69	Spanish Main Campground	0.035	EA	PP
70	Tampa Electric Company - Big Bend	0.0045	EA	SW
71	Tampa Electric Co. - Gannon	0.006	EA	PP
72	Tampa Livestock Dist.	0.006	EA	PP
73	The Big "T" M.H.P.	0.020	EA	PP
74	Thonotosassa Elem. School	0.0086	EA	PP
75	Town & Country M.H.P.	0.012	EA	PP
76	Twin Oaks Plaza	0.0105	AWT	SW
77	Valrico Hills Subdivision	0.100	CS	PP
78	Ruskin Tomato Growers	0.0065	EA	PP

TABLE IV-10 (Cont'd)

DOMESTIC TREATMENT PLANTS IN THE COUNTY SERVICE AREA

Reference No. 1	Name	Design Capacity MGD	Treatment[2]	Disposal[3]
79	Williams 301 Truck Stop	0.0125	EA	SW
80	Windward Knoll M.H.P.	0.026	EA	PP

Notes: 1 = Numbers refer to treatment plant locations shown on Figure IV-25.
2 = Treatment Processes:

EA = Extended Aeration
CS = Contact Stabilization
TF = Trickling Filter
AWT = Advanced Waste Treatment

3 = Disposal Methods:

PP = Percolation Pond
SW = Surface Water Discharge
R = Reused
DF = Drain Field
SI = Spray Irrigation

Performance of System - The entire Brandon Sewer System is of relatively recent construction. When the County wastewater facilities were placed in operation in May, 1972, the sewer facilities served only two shopping centers in the central Brandon area. The gravity sewers, force mains, and pumping stations making up the remainder of the Brandon Sewer System have all been constructed since then. This rapid expansion has resulted in an extensive network of manifold force mains.

The use of manifold force mains in the Brandon Sewer System has allowed rapid expansion of the system in a cost-effective manner. However, continued use of the extensive network of manifold force mains could result in major operational problems. Each additional pumping station added to a manifolded system results in new operating conditions for all the existing stations. As flow rates increase and as pump impellers wear, the likelihood of problems increases. These problems can include pumping station overflows, sewer surcharges, equipment failure, and the need for increased operator attention.

The Brandon East Wastewater Treatment Plant is a County-owned facility serving a subdivision south of Brandon. Although the plant's design capacity has not been exceeded, the facility is nearing the end of its useful life. Some of the structures suffer from corrosion. Equipment malfunction sometimes causes reduced treatment performance.

Numerous small, privately-owned package treatment plants are scattered throughout the CSA. The quality and maintenance of these facilities vary widely. In general, these installations are capable of providing acceptable treatment if well maintained and well operated.

Projected Wastewater Flows - Domestic and commercial wastewater quantities were estimated based on per capita flow rates determined from billing records. Industrial flow projections were made on the basis of anticipated industrial land use patterns and proposed expansion by existing industrial flow sources. Because the projected wastewater flows will be conveyed in systems constructed within the past 10 years, a reasonably low infiltration rate was used to estimate future flows.

Projected wastewater flows are summarized for the CSA in Table IV-11. The wastewater characteristics are projected to be: 225 mg/l BOD_5; 200 mg/l Total Suspended Solids; 35 mg/l Total Nitrogen, as N; and, 10 mg/l Total Phosphorus, as P.

Industrial Wastewater

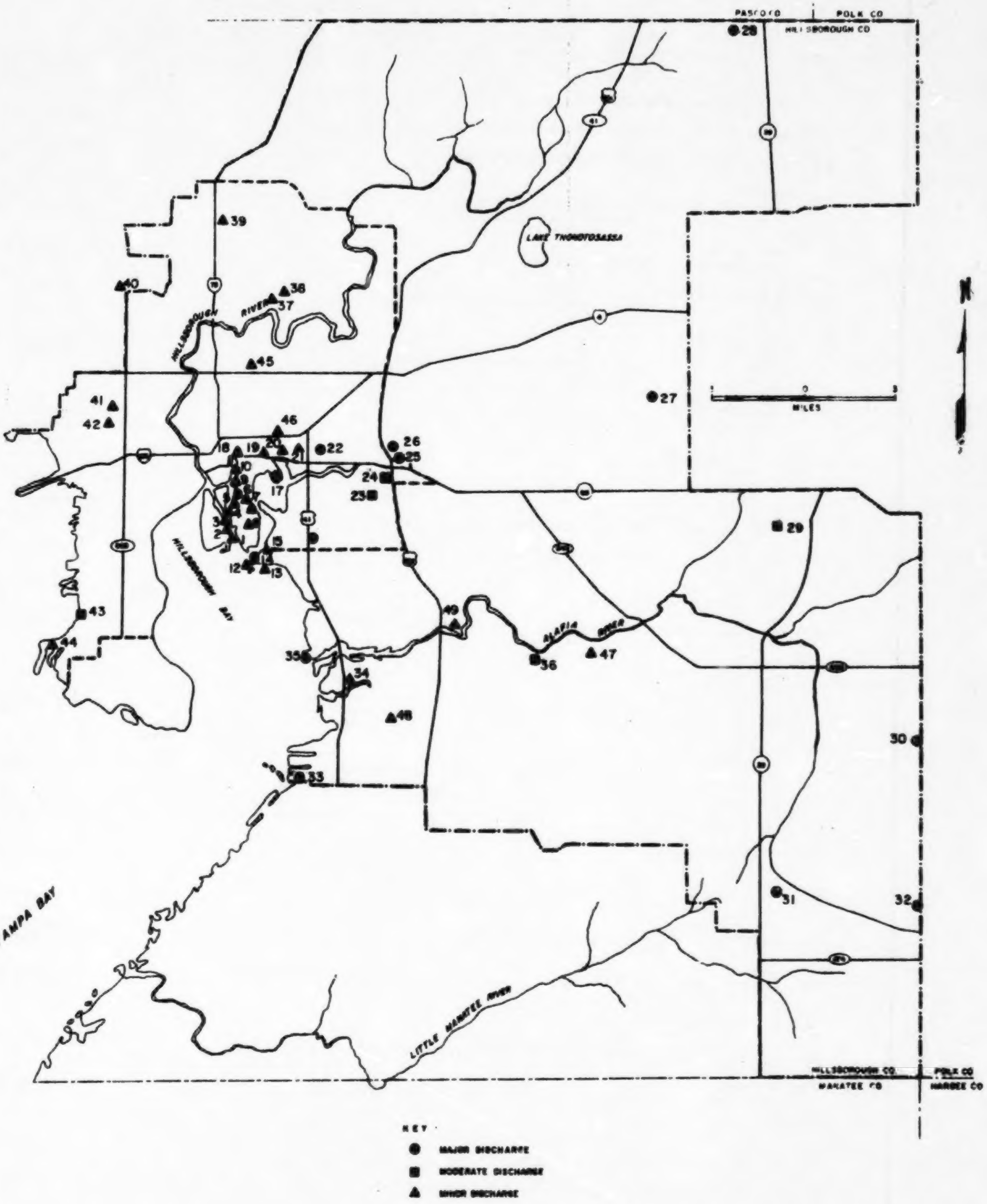
There are 48 sources of industrial wastewater discharge in the Planning Area. The location of these discharges are shown on Figure IV-26. As can be seen from this figure, most of the discharges are minor and are concentrated in the Hookers Point area of the Tampa Service Area. Characteristics of these discharges are summarized in Table IV-12.

TABLE IV-11

PROJECTED WASTEWATER FLOWS IN THE COUNTY SERVICE AREA

Study Area And Sewer District	1980	1985	1990	1995	2000	2020
1. Deltona Study Area						
Sewer District 1A	0.24	0.53	0.82	1.10	1.39	2.54
2. Northeast County Study Area						
Sewer District 2A	0	0	0	0	0	0
Sewer District 2B	0	0	0	0	0	0
Northeast - Total	0	0	0	0	0	0
3. Thonotosassa Study Area						
Sewer District 3A	0.08	0.20	0.32	0.44	0.55	1.02
Sewer District 3B	0	0	0	0	0	0
Sewer District 3C	0	0	0	0	0	0
Thonotosassa - Total	0.08	0.20	0.32	0.44	0.55	1.02
4. Brandon Study Area						
Sewer District 4A	0.91	2.33	3.75	4.68	5.60	9.57
Sewer District 4B	1.21	1.48	1.76	2.04	2.31	3.45
Sewer District 4C	0	0	0	0	0	0
Sewer District 4D	0.57	0.88	1.19	1.52	1.82	3.09
Brandon - Total	2.69	4.69	6.71	8.24	9.72	16.10
5. Riverview-Gibsonton Study Area						
Sewer District 5A	0.48	0.93	1.38	1.83	2.29	4.16
Sewer District 5B	0.49	1.27	2.03	2.79	3.56	6.85
Sewer District 5C	0	0	0	0	0	0
Sewer District 5D	0	0	0	0	0	0
Riverview-Gibsonton - Total	0.97	2.20	3.41	4.62	5.85	11.01
6. Southeast County Study Area						
Sewer District 6A	0	0	0	0	0	0
Sewer District 6B	0	0	0	0	0	0
Southeast - Total	0	0	0	0	0	0
County Service Area - Total	3.98	7.62	11.25	14.48	17.52	30.68

IV-61


PASCO CO
POLK CO
HILLSBOROUGH CO
LAKE THONOTOSASSA
HILLSBOROUGH RIVER
HILLSBOROUGH BAY
TAMPA BAY
ALAFIA RIVER
LITTLE MANATEE RIVER
MILES
0
3
N
HILLSBOROUGH CO
POLK CO
MANATEE CO
HARDEE CO
1
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KEY
● MAJOR DISCHARGE
■ MODERATE DISCHARGE
▲ MINOR DISCHARGE

SOURCE: SHAW, A.J. AND WILKINS, R.S., 1979

CENTRAL HILLSBOROUGH COUNTY-TAMPA
201 FACILITY PLAN
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EPA No. C120634010

SOURCES OF INDUSTRIAL WASTEWATER DISCHARGE

[illegible]

FIGURE IV-26

TABLE IV-12

INDUSTRIAL POINT-SOURCE DICHARGES

Location No.	Discharger	Design Capacity (mgd)	Average Daily Flow (mgd)	BOD$_5$	Suspended Solids	Total Nitrogen	Total Phosphorus	Ultimate Oxygen Demand	Primary Receiving Waters
				Loading in Discharge (lb/day)					
1	Union Oil Company	NPDES: Daily maximum oil and grease = 10 mg/l							Hillsborough Bay
2	Murphy Oil Co.	NPDES: Average daily oil and grease = 10 mg/l							Hillsborough Bay
3	S.T. Triangali Co.	Shrimp processing wastewater							Hillsborough Bay
4	Sulphur Terminals Co. Inc.	Boiler blowdown, noncontact cooling water, waste condensate, and treated domestic wastewater							Sparkman Channel
5	Superior Seafoods, Inc.	Shrimp processing							Hillsborough Bay
6	General Portland Inc.	Air compressor cooling water 137 mg/l							Ybor Channel
7	American Petrofina Co. of Texas	NPDES: Average daily oil and grease = 10 mg/l							Ditch to Sparkman Channel
8	Tampa Electric (Hookers Point Station)	-	513	-		-	-	-	Sparkman Channel
	Discharge #1	-	-	-	720.0	-	-	-	Sparkman Channel
	Discharge #2	-	-	-	50.0	-	-	-	Sparkman Channel
	Discharge #3	-	-	-	120.0	-	-	-	Sparkman Channel
	Discharge #4	-	-	-	-	-	-	-	Sparkman Channel
9	Cities Service Oil Company	NPDES: Average daily oil and grease = 10 mg/l							Drainage ditch to Hillsborough Bay
10	Texaco, Inc.	NPDES: Daily maximum oil and grease = 10 mg/l							Sparkman Channel
11	American Oil Co. (terminal)	0.10	-	NPDES: Average daily oil and grease = 10 mg/l; pH = 6.0-8.5					Sparkman Channel
12	Ideal Cement Co.	NPDES: Average daily temperature = 95°F							Hillsborough Bay
13	International Minerals & Chemical Company (IMC)	Cooling water discharge							Hillsborough Bay
14	Tampa Electric Co. (Gannon Sta.)	-	1279.7	Once-through cooling water, low volume waste sources, metal cleaning waste boiler blowdown, ash pond overflows, material storage, and construction runoff					Hillsborough Bay
15	W.R. Grace & Co.	-	1.44	Average winter temperature = 76°F, Summer = 81°F					Hillsborough Bay
16	Nitram Chemicals, Inc.	-	0.44	-	-	395	-	-	Delaney Creek
17	Tampa Municipal Incinerator	5.0	3.4	40.4	93.5	-	-	-	McKay Bay
18	American Can Co.	Cooling water discharge							Storm drain to Sparkman Channel
19	Del Monte Corp.	0.08	-	NPDES: Average daily temperature = 95°F					City drainage to McKay Bay
20	Union Carbide								
21	Davies Can Co.	NPDES: Daily average temperature = 95°F							Ditch to McKay Bay
22	Seaboard Coastline	0.325	-	Oil skimmer waste discharged during excessive rainfall					Creek to McKay Bay
23	Redwing Carriers, Inc.	0.01	-	30.0	Suspended solids = 30 mg/l; BOD$_5$ = 30 mg/l				Creek to McKay Bay

Reproduced from best available copy.

TABLE IV-12 (CONTINUED)

				Loading in Discharge (lb/day)					
Location No.	Discharger	Design Capacity (mgd)	Average Daily Flow (mgd)	BOD 5	Suspended Solids	Total Nitrogen	Total Phosphorus	Ultimate Oxygen Demand	Primary Receiving Waters
24	Compomar Modern Dairies	Dairy process water; infrequent discharge							Delaney Creek to Hillsborough Bay
25	Kaiser Agricultural Chem. Co.	-	0.04	-	11.5	211.0	-	-	Delaney Creek
26	M&T Chemicals, Inc.	-	0.001	0.6	Contaminants: iron, cyanide copper, lead, zinc				Ditch to McKay Bay
27	Treasure Isle Inc. (Ocean Products)	0.75	-	31.2	37.6	84.7	109.9	-	Onsite lake to Hillsborough River
28	C.F. Industries	-	-	-	264.0	61.0	90.0	-	Hillsborough River
29	Florida Agglite	-	3.7	Average total suspended solids = 28 m/l; total phosphate = 2.8 mg/l					Ditches to Alafia River
30	IMC	-	5.3	-	755.0	27.0	13.0	-	South prong, Alafia River
31	Brewster Phosphates	-	-	-	-	-	-	-	Emergency discharge to ditch to Alafia River
32	Borden, Inc. (Chemical Div.)	Contaminated rainwater (80 mg/l) discharged from setting pond during > 10-year 24-hour chronic rainfall event if waste setting pond is full							South prong, Alafia River
33	Tampa Electric (Big Bend Sta.)	-	1036	Treated boiler blowdown and untreated stormwater runoff					Canal to Tampa Bay
34	Gibsonton Speed Wash	0.02	-	Trickling filter wastewater					Ditch to Alafia River
35	Gardinier, Inc.	55.4	33.8	-	3949.0	416.0	1215.0		Alafia River
36	Spring Valley Dairies, Inc.	-	-	NPDES: Effective June 30, 1976, retain all process wastewaters plus 5 inches of rainfall from 24-hour incident					Bell Creek to Alafia River
37	Anheuser Busch	Cooling water is recycled and discharged with stormwater							Ditch to Hillsborough River
38	Mcgraw-Edison Power	Cooling water discharge							Hillsborough River
39	Bear Plaza Koin Kleen Laundry	0.005	-	Laundry wastewater overflow during excessive rainfall					Lake with no outfall
40	Honeywell, Inc.	0.57	0.38	Cooling water discharge					Barrow Pit to canal to Sweetwater Creek
41	National Papaya	-	0.001	Bottle wash water					Drainage ditch to Old Tampa Bay
42	U.S. Army Reserve Center	Discharge during excessive rainfall only							Tampa storm sewers
43	Gulf Gold (Seabrook Foods, Inc.)	-	0.1	260.0	111.3	30.14	-	-	Hillsborough Bay
44	Shell Oil Co.	Intermittent stormwater discharge							Tampa Bay
45	Winn Dixie Stores, Inc.	NPDES: Average daily temperature = 95°F							Hillsborough River
46	Ralston Purina	Boiler blowdown							McKay Bay
47	Rawlins Fish Farm	-	-	Fish culturing ponds overflow					Ditch to Alafia River
48	Scalare Hatchery	Fish culturing ponds overflow							Ditch to Bullfrog Creek
	Millard's Laundry	0.004	0.003	0.98	2.05	-	-	-	Alafia River to Tampa Bay

LOCATION NUMBERS ARE KEYED TO FIGURE 3-38.

SOURCE : SHAW, A.J. AND WILLIAMS, R.G., 1978

TEXAS INSTRUMENTS, 1978 and FDER,1979d

On-Lot Treatment Disposal Systems

Until recent years, the general method of wastewater disposal was through the use of individual septic tanks and drainfields. Within the TSA, it is estimated that there are approximately 14,000 septic tanks currently in use. In rural portions of the CSA, septic tank systems are used almost exclusively.

In general, much of the Planning Area is limited or unsuitable for the use of septic tank systems. The primary reasons for these limitations are shallow depth to the water table aquifer and/or a high frequency of flooding. Inoperative or malfunctioning septic tank systems have contributed to high nutrient loadings in the Planning Area's surface waters. Some suitable areas for on-lot systems do exist; most notably in the Brandon and Thonotosassa areas.

Financial Programs

Sewer rates in the Planning Area are based upon a percentage of the users water bill. However, sewer rates differ between the Cities of Tampa and Temple Terrace and Hillsborough County. Rates for water and sewer service as of April 1, 1979 are shown in Table IV-13.

Special Problem Areas

A major contributor to nutrient loadings of surface waters in the Planning Area is non-point source pollution. Urban/suburban stormwater runoff and runoff from agricultural operations, particularly livestock grazing areas, are considered the principal sources of pollution in the Tampa Bay region (TBRPC, 1978).

9. WATER SUPPLY

There are two major sources of water supply: ground water; and, the Hillsborough River. Of these two, ground water is the predominant source of water. A third source, ground water springs, is used to a minor degree.

Ground water wells are used extensively for home water supplies in areas unserved by public supplies. Agricultural and industrial supplies are obtained almost wholly through ground water wells.

Within the Planning Area, there are four major public water supply systems. These systems are the City of Tampa, the City of Temple Terrace, the Brandon and the Riverview-Gibsonton water systems. These systems are summarized in the following sections.

City of Tampa

The City of Tampa currently derives its water supply from both ground water and surface water sources. The major ground water source is the Morris Bridge Well Field, which is located northeast of the city.

The major surface water supply is derived from the Hillsborough River. Sulphur Springs also supplies surface water and is pumped into the Hillsborough River system to increase the quantity of this surface water source. Approximately 66 percent of the average daily water demand is supplied by the Hillsborough River. The remaining demand is split equally between Sulphur Springs and the Morris Bridge Well Field.

TABLE IV-13

CURRENT RATES FOR WATER AND SEWER SERVICE

	Hillsborough County	Tampa	Temple Terrace
Water[1]	$ 7.84	$ 5.13[2] 6.48[3]	$ 6.06
Wastewater[1]	11.60[4]	11.63[5]	12.20
Water Rate Per 1,000 gal. Above 9,000 gal. Average Use	0.71	0.57[2] 0.72[3]	0.70
Meter Installation Fee (5/8 inch)	100.00	130.00	90.00
Water Connection Fee[6]	260.00	450.00	--
Wastewater Connection Fee[6]	525.00	800.00[7] 200.00[8]	--

Notes:

[1] Average residential bill based on 9,000 gal./month, April, 1979.

[2] Rate inside the city limits.

[3] Rate outside the city limits.

[4] Flat rate for residential users. April, 1979.

[5] Includes $9.63/month wastewater disposal charge at within City rate of $0.80 per 100 cubic ft. (outside City rate is $0.877 per 100 cu. ft.) plus $2.00 per month sewer improvement charge. Sewer improvement charges vary with lines built under the current and three previous bond programs and can be paid as a lump sum or as a monthly charge over 20 years. The monthly charge for a typical residence under the current construction program is $4.36 per month. Monthly sewer improvement charges under the three previous bond programs are generally $1.00 or $2.00 per month for residences.

[6] Fees for standard 5/8 inch water meter used.

[7] Typical residence constructed after August 12, 1973.

[8] Typical residence constructed before August 12, 1973.

Treatment of water from these sources consists of two major facilities: one treatment plant at the Morris Bridge Well Field and another just above the dam on the Hillsborough River. The Morris Bridge Treatment Plant has a design capacity of about 40 mgd. Its major treatment processes consist of softening followed by filtration and chlorination.

Surface water from both the Hillsborough River and Sulphur Springs is treated at the Hillsborough River Treatment Plant located just above the Tampa Reservoir Dam. This plant has a capacity of 100 mgd when the water conditions are ideal and the color in the water is low. During periods of heavy rainfall, the raw water supply is high in color, which reduces the treatment capacity to about 72 mgd. The Hillsborough River Plant uses floculation and sedimentation followed by filtration and chlorination.

City of Temple Terrace

The Temple Terrace water supply is provided by seven wells. The waters from three of these wells are aerated and chlorinated and the waters from the other four wells are chlorinated at the well sites. A water treatment plant is currently being constructed and is expected to be on-line in 1981.

Hillsborough County

Brandon - This system consists of 26 wells, chlorination facilities, two repumping stations, and a distribution system which serves most of the Brandon Area. The wells serving the Brandon Water System are located generally north and south of Brandon. Water treatment consists solely of chlorination, which is provided at each well location. Water is pumped directly into the distribution system at each well location. The Brandon Water System has a pumping capacity of 12.1 mgd and a current average demand of approximately 3.9 mgd. The Brandon Water System is interconnected with the County's Riverview Water System. This interconnection, however, is only used when necessary and its use is metered.

Riverview-Gibsonton - The Riverview-Gibsonton Water System consists of eight wells which are located at one well field in the southeast portion of the Riverview-Gibsonton area. Water treatment for all of the wells is performed by one water treatment plant which is located at the well field site. This plant provides aeration, detention and chlorination before the water is pumped into the distribution system by high service pumps. The Riverview-Gibsonton Water system has a pumping capacity of 3.5 mgd. Average daily demand is approximately 2.4 mgd.

10. COMMUNITY SERVICES AND FACILITIES

Education Facilities

Tampa/Hillsborough County has a county-wide education system which operates 141 schools. The type of educational services offered includes an adult day high school, an adult evening high school, a learning center, and an adult technical school as well as elementary schools (91), junior high schools (26) and senior high schools (11). The system handles 113,140 students and 41,500 adults and is the 17th largest school system in the United States. The Hillsborough County School system employs 6,758 permanent instructional personnel. The pupil to teacher ratio is just over 20. This ratio is low because many instructors provide vocational or exceptional study instruction and deal with less than 20 students per class.

The Tampa/Hillsborough County area also has higher education facilities. The University of Tampa, the University of South Florida, Florida College and Hillsborough Community College serve the Planning Area.

Health Facilities

Tampa/Hillsborough County has a number of hospitals, medical schools and private physicians to handle the health needs of the area. There are more than 4,000 hospital beds in the 17 area hospitals (about one bed per 150 persons). As Tampa/Hillsborough County grows, the medical facilities must expand to keep pace (two planned hospitals will include 360 beds).

In addition to the hospitals there are almost 900 physicians and 240 dentists (about 700 persons per physician and 2600 persons per dentist). It is expected that the number of physicians and dentists will increase with increased population and that the local government will have to take little action in attracting physicians and dentists.

Libraries

Within the Tampa Service Area, the City Of Tampa has one central public library and five branch libraries located throughout the city. In addition, the City of Temple Terrace has a public library.

Two public libraries presently exist in the County Service Area: one located in Brandon; and, one located in Riverview. Residents within the eastern portion of the CSA also are served by a public library within Plant City.

In addition to the public libraries, the universities and colleges within the Planning Area maintain research-oriented libraries, which, although restricted, can often be used by the public.

Police

The Tampa Service Area is served by four police departments: the City of Tampa; the City of Temple Terrace; the County; and, a private police force maintained by and for the University of South Florida. The Tampa police force employs 691 people, 520 of whom are sworn police officers. The City of Temple Terrace is served by 30 employees, 23 of whom are sworn. The University of South Florida maintains a police force of 47 sworn officers and a total of 72 employees.

The County Service Area is protected by the Hillsborough County Sheriff's Department. The County employees a total staff of 999 people, 781 of whom are sworn police officers.

Fire

The Tampa Service Area is protected by a total of 22 fire stations, including one in the City of Temple Terrace, and three which are located in the unincorporated area of the County. The County Service Area contains nine fire stations located near the more populated areas. Portions of the County Service Area are also served by fire stations within the County but outside the 201 Planning Area boundaries.

The City of Tampa maintains a staff of full-time professional firefighters. The County fire force is composed of a mixture of volunteers and professional firefighters.

Tax Structure

The two major local taxing entities within the Planning Area are the City of Tampa and Hillsborough County. Both entities gain most of their tax revenues from the property tax. Table IV-14 shows the respective revenues for the city and county as reported in their most recent budgets. As can be seen, the City of Tampa obtains 30 percent of its operating funds from property taxes and the county 50 percent of its funds.

The property tax rate for Hillsborough County in 1977 was 16.93 mills which yielded about $98,000,000, half of which went to the school board and the other half went to the operation of the county government. In terms of millage rate, Hillsborough County ranks 14th in Florida. However, in terms of monies generated, only two counties are higher in Florida.

The millage rates for the City of Tampa was 9.8 for 1977, but was reduced to 9.75 for 1978. The funds generated comprise 30 percent of the revenues for the city.

PART D: ENVIRONMENTAL IMPACTS OF ALTERNATIVES

This part identifies the major impacts of all the alternatives, including the no-action alternative, on the natural and man-made environment. Impacts of the proposed alternative or strategy are discussed and compared with the impacts of the other alternatives. A detailed discussion of impacts is presented in Technical Reference Document, Volume II, Alternatives Development and Evaluation.

Since the alternatives primarily address existing problems, as opposed to future growth, impacts are primarily direct in nature and are associated with construction and operation activities. However, the indirect impacts associated with secondary development could have serious impacts on several environmental parameters in the Central Hillsborough County - Tampa 201 Planning Area.

Population growth in the Planning Area is expected to occur at approximately the same rate whether or not new wastewater treatment facilities are constructed. As a result, none of the alternatives are expected to appreciably affect future overall population growth. However, the alternatives may differ concerning their impacts on population density and the rate of development in some areas.

1. IMPACTS ON THE NATURAL ENVIRONMENT

Natural environment refers to the land and water resources of the study area along with the area's wildlife. The purpose of this section is to assess the impacts of wastewater facilities upon the natural environment of the study area. Impacts are generally assessed on a short-term and long-term basis. In the case of wastewater facilities, most short-term impacts will arise from the construction of facilities. Long-term impacts will arise from operations plus the type of effluent discharge which is selected.

Air Quality

The Tampa Service Area is classified a nonattainment area for suspended particulates. All of Hillsborough County is classified a nonattainment area for ozone. Air quality is negatively impacted by temporary increases in dust and

TABLE IV-14

REVENUE SOURCES FOR CITY OF TAMPA AND HILLSBOROUGH COUNTY

City of Tampa	Percent
Ad Valorem	30
Franchise Tax	9
Licenses and Inspections	4
Transfers	2
Federal	7
Utility Tax	17
State	13
Hillsborough County	2
Fund Balance	10
Other*	6
	100

Hillsborough County	
Federal Grants	1
State Sources	6
Property Taxes and Assessments	50
Licenses and Fees	12
Interest on Investments	1
Miscellaneous	8
Other	22
	100

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*Interest, fines, forfeitures, other agencies, parks, recreation, convention center, and intergovernmental transfers.

Source: Annual Budget, 1978-1979; City of Tampa, Tampa, Florida. Budget, Fiscal Year 1977-1978; Hillsborough County, Tampa, Florida.

exhaust emissions from vehicular traffic associated with construction, operation and maintenance of wastewater treatment and conveyance facilities. An increase in the number of treatment plants may increase emissions of aerosols, particulates and gases from these plants. Increases in development permitted by an increase in treatment capacity may also increase exhaust emissions from vehicles. Low density development in portions of the County Service Area served by the "No Action" alternative may result in increased motor vehicular emissions then the other alternatives because of increased driving distances. Immediately affected would be areas such as the Deltona, Riverview-Gibsonton and portions of the Brandon areas.

Several alternatives propose disposal of effluent by spray irrigation land application systems. Land application systems may negatively impact air quality by increasing aerosol formation with pathogen transmission from the spray systems.

Short-term negative impacts to air quality are generally directly proportionate to the distance of pipeline construction and the number of treatment facilities constructed. The preferred alternative results in a phased approach to construction of sewer lines and minimizes the number of new facilities constructed. However, construction of any of the proposed alternatives is not expected to have a significant impact on air quality in the Planning Area.

Odor

There are no pervasive odor problems within the Planning Area. Alternatives proposing the use of a land application system to dispose of wastewater may result in odors caused by anaerobic conditions at the site on the effluent. The No Action alternative within the County Service Area will result in continuing use of septic tank systems. The larger number of systems will increase the possibility of malfunction and resulting odor problems.

Topography

Wastewater treatment projects rarely have topographic impacts. Construction can have a significant negative impact on topography. The no-action alternative does not involve any construction in the study area and has no impact on topography.

Pipeline construction follows existing road rights-of-way or gently rolling agricultural land and has slight topographic impact. Most slight topographic changes caused by construction can be returned to their original conditions. Treatment alternatives involving the least amount of construction have the least chance of impact. Alternative S-1, disposal of the TSA's effluent by spray irrigation, would significantly affect the topography of the southeastern Planning Area due to large land requirements.

Geology

None of the proposed alternatives has a significant impact on the Planning Area geology.

Soils

There are eleven soil associations in the study area. Soil characteristics such as depth, moisture content and location are dependent in large part on the regional topography. None of the proposed alternatives will change the regional topography. The no-action alternative would involve continued and increased use of on-lot systems in areas where regional treatment facilities would not be available.

In these areas, soil characteristics may undergo local change if they become clogged from improperly designed, installed or constructed systems. The impacts of poorly functioning septic systems on the area's ground and surface waters are discussed in following sections.

None of the alternatives involve removal or transport of large amounts of soil so construction of facilities and pipelines will not significantly impact the soil system. In that respect, there are no detectable differences in impact among the alternatives.

Alternatives using land application to dispose of treated effluent may affect soil drainage characteristics and levels of chemical constituents. This could be a moderate adverse impact in a localized area. However, the impacts of the alternatives, including the preferred alternative, on soil conditions in the area are not highly significant.

Noise

The study area has relatively low ambient noise levels. Short-term noise impacts are generally associated with pipeline and facility construction and are caused by movement of heavy equipment, possibly blasting, and ditch digging. Facility operation and maintenance noise includes operation of mechanical aerators and some increase in vehicular traffic. The no-action alternative does not involve construction or increased operational noise but may result in more vehicular traffic on area roads due to increased urban sprawl. However, noise impacts associated with any of the proposed alternatives are either short-term or localized low levels and are not significant to the Planning Area.

Surface Water Resources

The major surface water resources in the Planning Area are the Hillsborough and Alafia Rivers and portions of the Tampa Bay System. Lesser water bodies impacted by the 201 planning process include Bullfrog Creek and Delaney Creek.

The major surface water pollution problem in the Planning Area is high nutrients and, at times, bacteria concentrations. While the majority of this problem is attributed to non-point sources of pollution discharges, the problem has been aggrevated by malfunctioning septic tank systems and package treatment plants. One area of special concern is the Hillsborough River which is utilized by the City of Tampa as their major drinking water source.

All of the alternatives proposing discharge of treated effluent to surface waters will increase nutrient loading within the surface water resources. Wasteload allocation studies are performed to ascertain the degree of treatment required prior to discharge, ensuring that water quality standards are met. Disposal of wastewater from the Hookers Point facility by Gulf outfall (Alternative S-2) would alleviate the problem within the Planning Area but may result in transferring the problem elsewhere.

Alternative D-1, disposal of treated effluent from the Deltona Study Area by wetlands application, results in the potential for contaminating the City of Tampa's water supply (Hillsborough River) if treatment levels are exceeded or plant malfunctions occur.

In general, the No Action alternatives result in the greatest impact to the Planning Area's surface waters. Under the No Action alternatives, wastewater treatment needs of future development are expected to be satisfied by the continued use of on-lot treatment systems. Future development areas in the Deltona Study Area, the Riverview-Gibsonton Study Area and the northeastern portion of the Tampa Service Area are generally unsuitable for septic tank systems. Improper use of septic tank systems in these areas may result in further contamination of the Planning Area's waters.

Use of septic tank systems in unsuitable areas in the Riverview-Gibsonton area represent a threat to the water quality of the Alafia River, Bullfrog Creek and Hillsborough Bay. Use of septic tanks or wetland application in the Deltona Area represent a threat to the Hillsborough River. Without construction of the second phase of the Northeast Interceptor, development may occur with attendant septic tank usage within the floodplain of the Hillsborough River upstream of Tampa's water supply intake. Malfunctioning of septic tank systems in this area represent a potential threat to Tampa's drinking water supplies.

In the Thonotosassa Study Area, the preferred alternative is the No Action alternative. However, soils in the Thonotosassa Study Area are considered suitable for septic tank usage. For the projected population, no impacts to the area's surface waters are anticipated.

The preferred alternatives result in the least negative impacts to the Planning Area's surface waters. Even discharge of properly treated effluent from the City of Tampa's Hookers Point facility to Hillsborough Bay will have no significant impact on Bay water quality (Ross, 1977, 1978).

Construction activities could produce major sediment loads to the Hillsborough and Alafia Rivers and Hillsborough Bay, especially during pipeline construction. However, this short-term impact would have greater implications on aquatic organisms than water quality.

Subsurface Water Resources

Ground water is used extensively in the Planning Area for domestic and agricultural supplies. At the present, ground water contamination problems are minor and generally localized.

The continued use of septic tanks in areas unsuited for septic tank usage may result in local contamination of the surficial ground waters. Areas unsuitable for septic tank use were discussed previously under the impacts on the surface water resources. Similarly, malfunctioning septic tanks could degrade the upper portion of the shallow aquifer in these areas prior to entering surface waters of the Planning Area.

The area around Brandon is considered a recharge area for the Floridan Aquifer due to the occurrance of karstic features. Increased usage of percolation ponds in this area would represent a potential threat of future ground water contamination in this area. The continued use of septic systems in this area (preferred alternative) will require monitoring in area water supply wells to identify any future contamination which would necessitate the need for sewer service.

The continued use of septic tanks in the Thonotosassa Study Area is not expected to significantly impact the ground water system due to the suitability of the soils for septic tank usage.

In general, the preferred alternatives result in a major beneficial impact to the subsurface water resources of the Planning Area. The use of spray irrigation effluent disposal for the Brandon Study Area could impact the ground water system. However, with proper installation, operation and maintenance, these practices should not have significant adverse impacts.

Surface Ecosystem

The major surface water resources in the Planning Area are the Alafia and Hillsborough Rivers and portions of the Tampa Bay System. These resources presently have adequate water quality and support diverse biological communities. Increases in pollution loadings would seriously threaten these communities. Therefore, the No Action alternative will result in greater impacts than some of the other alternatives by virtue of increased pollutant loadings resulting from malfunctioning septic tank systems, percolation ponds, and/or sewer systems.

Erosion and sediment transport from dewatering and construction activities will be the primary impacts on aquatic ecosystems in the area. Settleable solids may increase with impacts on respiration and feeding by benthic organisms. Colloidal solids will reduce light transmissivity, adversely affecting photosynthetic activity and interfering with respiration of fish and filter feeding invertebrates.

Urbanization in some areas may result in significant changes in aquatic organisms, particularly those species in the estuaries of the Tampa Bay/Hillsborough Bay area, through increases in non-point source runoff into streams. These new non-point source discharges may increase the transport of soluble metals and organic compounds into the adjacent wetlands and estuaries resulting in a net increase in mass balance of substances harmful to aquatic biota. However, urbanization is expected to increase with or without wastewater system improvements.

In general, deterioration of aquatic habitats in the area may be expected because of increased development, with replacement of less sensitive species with those that are pre-adapted to societal perturbations. The degree of deterioration will be determined by specific developmental processes and land use measures enacted to protect sensitive areas.

The Deltona region is composed of a variety of relatively undisturbed habitats, including portions of one of the largest remaining hardwood river swamps in the state. The Deltona Study Area is presently nearly undeveloped and potentially provides habitats for most of the protected plants and animals which are expected to occur within Hillsborough County. The increased societal development associated with sewering this area will disrupt and fragment this wildlife habitat and result in a reduction in animal density and diversity. While development in this area may proceed even under the preferred alternative, EPA policy and regulations specifically discourage allocating federal funds to sewer interceptors that would destroy significant wetland areas.

Environmental effects of the proposed action on terrestrial flora and fauna will stem from urbanization in newly sewered, previously rural areas. Fragmentation of existing wildlife habitats will increase and native vegetation will be replaced with urban species. Wildlife will withdraw from the area due to increased human disturbances and loss of suitable habitat and be replaced by species preadapted to societal development.

Rare and Endangered Species

As discussed above, rare and endangered species may withdraw from the area or experience mortality due to increased urbanization. However, this urbanization is projected to occur with or without improved wastewater facilities.

The disposal alternatives which result in disturbance to the largest land areas are those alternatives utilizing spray irrigation. Depending on site locations, preparation of the spray irrigation sites may threaten the habitats of rare and endangered species. Site specific studies will be performed at the proposed Brandon spray site (preferred alternative) to determine the potential for impacting rare and endangered species.

2. IMPACTS ON THE MAN-MADE ENVIRONMENT

The man-made environment refers to the population and economy of the Central Hillsborough County - Tampa 201 Planning Area as well as to the larger network of supporting facilities and institutions that provide service to the area. It is a dynamic environment, reflecting the continual interaction of cultural, political, demographic and economic influences. This section identifies the potential primary effects of all wastewater management alternatives on key aspects of this man-made environment. Primary effects are those impacts resulting directly from construction and operation of the proposed facilities. This section also identifies secondary impacts - those caused by the population growth and residential development that the proposed facilities will support. These impacts do not differ greatly because population growth is expected to be similar with or without the proposed project.

Impacts upon the man-made environment resulting from construction and operation of the preferred alternative are not expected to be extensive. Generally, the greatest impacts resulting from the construction of wastewater alternatives are the impacts upon population growth and land use. Population growth with or without the project will be considerable. Land use impacts with or without the project will also be similar.

Because of the lack of extensive areas suitable for septic tank system usage, it is expected that a density of four dwellings or less per acre will be strictly enforced. As a result, projected growth in the County Service Area would be less dense under the No Action alternative than it might otherwise be. This could lead to either greater population density within the City of Tampa or more dispersed, low-density development in some portions of the County.

The man-made parameters, and a discussion of potential impacts on them are presented in this section.

Population

One of the major features of developing new or expanded wastewater facilities are the impacts upon population growth. Wastewater facilities can serve as a stimulus to population growth in certain areas which in turn impact a variety of man-made features. However, population growth within this Planning Area is not expected to be significantly different for any of the alternatives.

Land Use

Land use patterns are expected to change with or without the proposed project. The population of the Planning Area is expected to continue its rapid increase.

The County has granted a number of approvals for new developments in the area. Alternatives that result in the sewering of rural areas may result in urban sprawl. The preferred alternative results in an orderly growth by phasing wastewater facilities to meet the needs at the time.

Economic Conditions

The impact upon the local economy will come from both the short-term construction impacts and the long-term investment from the improvement of wastewater treatment in the study area. Construction activities associated with the preferred alternative will be fairly extensive and should have some short-term impacts upon the study area. The effects of construction on the local economy would depend upon where workers reside and where equipment and materials are purchased. It is likely that the project would create construction employment and would also pump additional money into the local economy for the purchase of housing, equipment and materials.

Historical, Cultural And Archaeological Resources

Historical and archaeological resources are scattered throughout the Planning Area. Sewer construction may impact these sites or hitherto unknown sites. Alternatives S-1, disposal of Hookers Point effluent by spray irrigation, could impact historical and archaeological resources due to the large land requirements needed for disposal sites. In general, without prior recovery of artifacts, the proposed project could result in loss of currently unknown sites.

Recreational Resources

The selected alternative is not expected to have any adverse impact on the recreational resources of the Planning Area. One beneficial impact may be the upgrading of the Planning Area's surface water quality resulting in increased recreational opportunities.

However, as a result of the projected increase in population, the existing park system is insufficient. To prevent over-crowding and resultant deterioration of the existing park areas, additional areas will have to be developed. Sufficient undeveloped land is expected to be available to meet the increased park area demand.

Transportation Facilities

Transportation facilities can be impacted through construction activities and increased demand associated with secondary growth. The impacts of the latter development are not significantly different between alternatives because of the projected increase in population with or without the proposed project. As a result of this population growth, traffic conditions in the Planning Area will be considerably more congested than at present. Operation of existing facilities will be at full capacity, resulting in instable traffic flows which may, at times, halt completely. Proposed expansion of the existing highway system may not be extensive enough to maintain existing service levels for the projected service demands.

Resource Use

Pressure on resource supply or availability in the Planning Area is expected to be the same for all alternatives because of the similar population increases expected. Any potential shortages can be alleviated by appropriate advance planning by local planning agencies.

Wastewater Treatment Facilities and Programs

The proposed action should have a positive impact on current treatment facilities and programs. Implementation of the selected alternative would upgrade current treatment programs, improve wastewater collection systems and provide sewer systems to areas currently served by individual on-lot systems where appropriate. Long-term impacts would be decreased pollution to surface waters by removing inoperative and/or malfunctioning treatment systems.

Water Supply

The major water supply sources for the Planning Area are the Hillsborough River and the ground water resources. In general, the proposed action should improve, to some degree, the quality of ground water by eliminating some discharge of effluent from on-lot systems and package plants. Surface water quality should be improved by the elimination of overloaded and deteriorating facilities in the city system.

The preferred alternative of not constructing Phase II of the Northeast Interceptor creates a potential impact to the City of Tampa's drinking water supply if development is allowed to proceed in this area and septic tank systems are used to meet wastewater requirements. The malfunctioning of such systems represents a potential source of contamination to the Hillsborough River upstream of Tampa's water supply intake.

As population in the Planning Area increases, the water supply demand will also increase. As a result, additional water treatment and supply systems will have to be constructed. Future water supplies will require careful consideration. Lowering of the potentiometric surface by ground water withdrawals could induce saltwater intrusion along the coast and sinkhole development in potential sinkhole areas. In addition, as other surrounding coastal areas continue to develop the competition for available water supplies will also increase.

Community Services and Facilities

Community services include health care, education and libraries, fire protection, police protection, and the administrative structure to manage those services. Generally, impacts to community services are associated with increased population size. There are no significant differences between the alternatives with respect to impacts on community services due to the large projected population increases for all the alternatives. The premature sewering of currently undeveloped areas would cause the greatest adverse impact since all other services would have to be extended to these areas.

As population increases and larger areas become developed, community services will have to be expanded to provide adequate levels of service. Fire departments, police departments, hospitals, schools and libraries and the administrative structure to manage these services will have to be expanded. The population increase causing this expansion also represents an increase in the tax base to fund this expansion. However, increased taxes are generally required to fund extensive additions to community services in rapidly developing areas such as this. This situation becomes even worse when zoning decisions are made which do not follow the recommendations of the comprehensive plan.

PART E: MITIGATIVE MEASURES

The purpose of this part is to discuss measures which would reduce the severity of those environmental impacts outlined in Part D. These mitigative measures address activities to be instituted during the design, construction and operational phases of the preferred alternative. While these mitigative measures will not eliminate the environmental impacts, they will reduce the severity of identified adverse impacts. It should be noted that many of the measures identified in this part are not within the purview of EPA to implement, but are the functions of state or local governments.

1. MITIGATION OF IMPACTS ON THE NATURAL ENVIRONMENT

This section addresses the areas of impact described in Part D, Section 1 of this chapter. In each case where an adverse impact on any natural parameter is anticipated, potential mitigative measures are discussed. Generally, adverse impacts on natural resources are the result of construction activities. Therefore, for the most part, mitigative measures deal with effective methods of mitigating potential impacts during and immediately following construction.

Air Quality

While some impacts on air quality will be long-term in nature, the short-term construction impacts on air quality will be more noticeable (but moderate in nature). Suspended particulates (dust) and equipment emissions are expected to increase during construction. These may be mitigated by the following controls:

1. Utilize construction equipment which meets current emission standards.
2. Immediately revegetate all cleared areas during the construction process.
3. Utilize scheduled and frequent dust containment practices such as the spraying of exposed areas.
4. Minimize the amount of land under active construction at any one time.
5. Minimize open burning during construction activities.

Odor

Overall impact of the alternatives on odor will be minimal. However, minor odors may originate from the proposed spray irrigation areas in the Brandon Study Area. These minor impacts can be mitigated by the following:

1. Control land use of areas adjacent to treatment sites in order to discourage residential development and encourage agricultural or industrial development.
2. Institute proper sludge management techniques in order to reduce odor production.

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Noise

The impacts of noise will be noticeable only during construction activities. Long-term impacts to noise will be associated with treatment plant and pump station operation but should be minimal. Construction impacts can be mitigated by:

1. Requiring sound control devices on construction equipment.
2. Limiting construction activities to normal business hours.

Geology

No impacts will occur that require mitigation.

Soils

The major soil impact will be through soil erosion during construction. This impact can be reduced by:

1. Limiting the size of the pipeline corridor to the minimal possible areas of disturbance.
2. Prepare and strictly enforce construction plans which require the rapid stabilization and revegetation of construction areas.
3. Institute best management controls in order to reduce the amount of non-point source runoff from construction sites.

Surface Water Resources & Aquatic Ecology

Impacts to the surface water resources in the Planning Area will generally be associated with construction activities due to erosion and sedimentation. Measures to minimize these impacts are discussed under soils.

Increased urbanization in the Planning Area will result in increased non-point sources of pollution. Management controls for non-point sources of pollution outlined in the 208 Plan for the Tampa Bay Region should be employed to minimize this impact.

Subsurface Water Resources

Use of the proposed method of spray irrigation for effluent disposal in the Brandon Study Area represents a source of ground water pollution if severe plant malfunctions occur. Strict enforcement of treatment requirements and careful design of the proposed facility are necessary measures in ensuring maintenance of ground water quality.

2. MITIGATION OF IMPACTS ON THE MAN-MADE ENVIRONMENT

This section addresses the areas of impact described in Part D, Section 2 of this chapter. In each case where an adverse impact on any man-made parameter is anticipated, potential mitigative measures are briefly discussed. These mitigative measures, for the most part, involve implementation of tools for effective planning and environmental protection in the Central Hillsborough County - Tampa 201 Planning Area.

Population and Land Use

The population of the Planning Area is expected to continue its rapid growth with or without the proposed project. There are available several planning and regulatory tools to be employed by the municipalities and government agencies, that can be effective in managing growth and environmental change. Through effective management of land use, any potential increases in population would also be managed effectively. Planning and regulatory tools considered are discussed in the following section.

Land Use and Development Controls

In order to effectively plan and manage land resources, there is a variety of techniques available to municipalities in the study area. The following specific land use and development controls could be made available to municipalities to help manage land use effectively.

Comprehensive Plans - The comprehensive plan provides a complete framework for community development. The plan includes goals and objectives, a land use plan, transportation plan, community facilities plan, an evaluation of environmental considerations, and the community's relationship to the region and to adjacent communities. Such a comprehensive plan has been developed for the County (Horizon 2000 Plan) and also for the City of Tampa (Tampa 2000 Comprehensive Plan).

Zoning Ordinances - The zoning ordinance is a strong tool for implementing a comprehensive plan through the municipality's inherent power to excercise reasonable control over property and persons under its jurisdiction. It is especially important that the zoning ordinance be consistently administrated for land use, community facilities, and other local planning to be effective. Both the County and the City of Tampa are presently undergoing comprehensive revision. Proposed changes are expected to be available for public review by the end of 1981.

Easements - Positive and negative easements are ways to acquire a permanent interest in land. Governments, individuals, and organizations may obtain positive easements in order to establish the legal right to use part of another's private land for certain limited and stated purposes. Negative easements permanently limit and owner's use of his land, but do not provide for public use. For example, the purchase of conservation easements would limit development in critical areas such as woodlands, rugged terrain, floodplains and open spaces.

The County has the ability to establish conservation easements through community unit zoning. A developer may set aside sensitive areas, as identified by the Hillsborough Environmental Protection Commission, and receive a "density credit" for this designated area. This density credit can then be transfered to developable uplands.

Fee Simple Acquisition of Land - The outright acquisition of land can be accomplished through purchase and lease-back arrangements with a willing owner. Land subjected to tax delinquency can be purchased at certain auctions, or land can be acquired if there is a mortgage in default of payments. Gifts of land are also possible from citizens, groups and corporations to municipalities, conservancies, and other organizations. Scenic or conservation easements can be purchased to protect natural resources. Neither the County nor City of Tampa actively pursue this method of land development control.

Conservation Zoning District - These are established to control development in areas where physiographic problems exist such as steep slopes, difficult access, or outstanding natural beauty and environmental value. These areas might be appropriate for uses such as forestry, recreation, agriculture, and perhaps even some low-density residential development.

The County does not employ this development control method. The City of Tampa is currently considering implementation of some form of Conservation District for "green areas" identified in the comprehensive plan.

Transfer of Development Rights - The transfer of development rights is a way to acquire a permanent interest in land. Local governments may acquire an owner's right to develop his land through purchase or other compensation. The owner retains title to his land but cannot develop it into, say, a housing subdivision. This method can be used to protect sensitive areas such as agricultural lands, wetlands and floodplains. Neither the City nor the County presently employ this method of development control.

Floodplain Ordinances - As more and more land is developed, it is essential that floodplains remain undeveloped and protected in order to minimize damages resulting from flooding. Floodplain zoning districts should protect, at a minimum, all lands located within the 100-year flood zones of every stream. In general, no structures or fill should be allowed in these areas, and land uses should be restricted to agriculture, recreation, and other appropriate land uses.

The applicable County regulation establishes minimum floor elevations but does not restrict development in floodplain areas. The City of Tampa currently has an ordinance which restricts development in the Curiosity Creek/Forest Hills area preventing development in flood-prone areas.

Control Of Non-Point Pollution Sources - There are a number of administrative and regulating approaches to reducing the impact of non-point source pollution. These approaches are described in the 208 Facilities Plan for the Tampa Bay Region.

Economic Conditions

The selected alternative is not expected to cause any significant, long-term adverse impacts on the economy of the study area.

Historical Cultural and Archaeological Resources

There is a potential that undetected archaeological and/or historical resources could be present within areas of planned construction. Construction of pipelines could ruin the value of these resources. In order to mitigate or avoid any adverse impacts to historic and archaeological resources, a qualified archaeologist will perform a standard archaeological and historic sites survey prior to construction if mandated by the State Historic Preservation Officer and State Archaeologist.

Recreational Resources

Mitigative measures are not called for here, since the proposed action will not cause any significant adverse impacts to existing recreational resources.

Transportation

Transportation problems caused by the projected population growth can be alleviated through planning. Planning for growth allows local governments to establish a network of feeder routes and streets that both alleviate congestion and tend to organize residential patterns. Air and noise pollution can also be reduced using careful transportation planning.

Resource Use

Again, any adverse impacts to resources can be mitigated through use of planning tools. The implementation of soil erosion and sedimentation control plans might help alleviate any sediment problems caused by removal of the protective vegetation cover when laying interceptor lines.

Water Supply

The potential for adverse impacts to the City of Tampa's water supply exists if development is allowed within the floodplain of the Hillsborough River in the Northeast Study Area. The potential for this impact can be mitigated by implementing a sound floodplain protection ordinance prohibiting development in this area.

Problems associated with increased demand can be mitigated by rewriting plumbing codes to require the use of water saving devices and by the institution of wastewater recycling. The feasibility of recycling is being studied as part of this 201 EIS program.

Community Services and Facilities

Planning recommendations should be implemented which would make available sufficient space for facilities when the need for additional facilities arise. Plans for necessary future expansion are presented in the Horizon 2000 Land Use Plan. It is also very important that zoning decisions support the comprehensive planning program for that program to have a chance to succeed

CHAPTER V - EIS COORDINATION

PART A: INTRODUCTION

Public participation is an important part of the EIS process. It provides for active public involvement in developing and evaluating wastewater facilities. Moreover, it is required by federal regulations governing the preparation of environmental impact statements.

At the beginning of the Central Hillsborough County/Tampa Area EIS and 201 Facility Planning process, a public participation program was established to provide opportunities for interested groups, individuals and governmental agencies to participate in the development of the EIS. This participation was achieved through the use of scoping meetings, a Citizen Advisory Committee, public meetings and constant coordination with local, regional, state and federal agencies.

PART B: COORDINATION WITH LOCAL, REGIONAL, STATE AND FEDERAL AGENCIES

Throughout the EIS process, it was necessary to contact many agencies - local, regional, state and federal in order to gather data which aided in the preparation of the various documents produced. Table V-1 is a listing of the major agencies contacted.

PART C: PUBLIC PARTICIPATION PROGRAM

1. SCOPING MEETING

A public scoping meeting was held in Tampa on December 20, 1978. The proposed development of the EIS and 201 Facility plan was discussed. Representatives of the City and County governments, the 201 consultants, the EPA, and the EIS consultant presented the goals and objectives of the coordinated 201 Facilities Plan/EIS. Comments were solicited from the attending public. In general, the public was concerned with improvement of area water quality, at affordable costs, and with maximum reuse of water to the extent possible.

2. CITIZEN'S ADVISORY COMMITTEE

The establishment of a Citizen's Advisory Committee was an important aspect of the Environmental Impact Statement (EIS) Public Participation Program. The committee was formed with the express purpose of focusing the attention of local residents and public agencies on the EIS. The committee consisted of 22 members and was representative of a cross-section of local interests. Each member of the group was asked to review and comment on all study materials, as well as to offer any other input during the course of the study. Several committee meetings were held throughout the study for review purposes. The contribution of the group was especially important in providing EPA with the information necessary to identify a preferred alternative. Specific functions and duties of the group included:

1. Identify local planning and environmental objective.
2. Identify study area issues and conflicts regarding wastewater disposal and environmental conditions.
3. Assist in development and evaluation of wastewater alternatives.

TABLE V-1

COORDINATION WITH FEDERAL, STATE, REGIONAL AND LOCAL AGENCIES

FEDERAL CONTACTS

U.S. EPA, Region IV
U.S. Geological Survey
U.S. Army Corps of Engineers, Jacksonville District
U.S. Department of Agriculture, Soil Conservation Service
U.S. Department of Commerce
U.S. Department of Housing and Urban Development
U.S. Fish and Wildlife Service

STATE CONTACTS

Florida Department of Environmental Regulation
Florida Bureau of Geology
Florida Department of Transportation
Florida Bureau of Census
Florida Department of State, Division of Archives
Florida Department of Education
Florida Department of Natural Resources
Florida Game & Freshwater Fish Commission

REGIONAL CONTACTS

Southwest Florida Water Management District
Tampa Bay Regional Planning Council
West Coast Regional Water Supply Authority

LOCAL CONTACTS

Hillsborough County Environmental Protection Commission
Hillsborough County Planning Commission
City of Tampa
Hillsborough County

4. Review draft and final Environmental Impact Statement.

Members of the Citizen's Advisory Committee are listed in Table V-2.

3. ADVISORY COMMITTEE MEETINGS

Meetings of the Advisory Committee were held at various intervals in the 201 planning process. Minutes of these meetings are included in the 201 Facility Plan, Appendix A, "Public Participation Information".

The first meeting of the Advisory Committee was held on June 8, 1979. The facilities planning process was explained to the committee and the responsibilities of the committee in developing an effective plan were discussed. Environmental considerations and general alternatives for sewage collection, treatment and disposal were also discussed.

On August 30, 1979, the baseline environmental conditions of the planning area and alternative plans for wastewater collection, treatment and disposal were presented to the Advisory Committee. Several of the committee members and their representative organizations submitted comments on the information presented. In response to these comments, a workshop meeting was held on September 18, 1979, to discuss the comments in detail.

The baseline environmental conditions and alternatives were also presented at a workshop held with representatives of FDER and EPA on September 25, 1979, and at a meeting with the EPA project engineer on October 11, 1979. These meetings were held to inform these review agencies of the progress of the planning project and to assure that all potential alternatives were being considered.

On December 18, 1979, results of the cost-effectiveness evaluation and the environmental aspects of the alternatives were presented to the Advisory Committee. Recommendations for a final plan were made by the consultants and discussed with the committee.

4. PUBLIC MEETING

A public meeting on the alternative evaluation and recommended plan was held on December 19, 1979. This meeting was well advertisied to encourage interest from the general public and received media coverage. Minutes of this public meeting are also included in Appendix A of the 201 Facilities Plan. The protection of wetland areas in the Hillsborough River floodplain and the Deltona Study Area was a major concern voiced by environmental groups.

TABLE V-2

CITIZEN'S ADVISORY COMMITTEE MEMBERS

Ron Smola
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Urban Environmental Coordinator
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Valrico, Florida 33594

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Committee of 100
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TABLE V-2 (Cont'd)

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Mrs. Phyllis Sharpe
Ms. Sally Casper
Tampa Audubon Society
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CHAPTER VI - LIST OF PREPARERS

PROJECT PERSONNEL

U.S. Environmental Protection Agency

Robert B. Howard	Chief, EIS Preparation Section
Robert C. Cooper	EIS Project Officer
David Peacock	Chief, Florida/Mississippi Facilities Planning Section
Fritz Wagner	201 Project Engineer
Bill Kruczynski	Ecological Review Branch

Consultants

Dames & Moore

T.M. Gurr	Project Director
Lawrence J. Maron	Principal Investigator - Surface Water Editor - DEIS
Michael A. Luckett	Principal Investigator - Geology
Mark R. Stephens	Principal Investigator - Ground Water
Thomas Simpson	Principal Investigator - Biology
W. Terry White	Principal Investigator - Socioeconomics
Marvin Smith	Principal Investigator - Land Use
James Little	Principal Investigator - Air Quality
Robert Glassen	Associate Project Manager Editor - Technical Resource Documents, Volumes I and II

City of Tampa

Howard Curren	Project Manager

Hillsborough County

Warren Smith	Project Manager (1979)
Victor Formby	Project Manager (1980-81)

REFERENCES CITED

Affenberg, W., 1978, Gopher Tortoise/Threatened, Florida Museum, University of Florida, Gainesville, In: Rare and Endangered Biota of Florida, Volume III.

Carr, A. and C.J. Goin, 1955, Guide To The Reptiles, Amphibians and Freshwater Fishes of Florida, University of Florida Press, Gainesville, Florida, 341 pp.

Cowell, Bruce C., D.G. Burew, L.N. Brown, R.W. McDiarmid, G.E. Woolfenden, 1976, Biological Assessment of the Lower Hilisborough Flood Determination Area For Recommendation Of Ecologically Based Land Management, Submitted to Southwest Florida Water Management District by University of South Florida, Department of Biology.

Dames & Moore, 1975, Hydrobiologic Assessment of the Alafia River and Little Manatee River Basins, Prepared For Southwest Florida Water Management District.

Duerr, D., 1975, The Potentiometric Surface And Water Quality Of The Floridan Aquifer, In: Southwest Hillsborough County, Florida 1952-74, Investigation No. 50-75.

Edmisten, J.A., 1963, The Ecology Of The Florida Pine Flatwoods, Ph.D. Dissertation, University of Florida, Gainesville, Florida, 108 pp.

Florida Department of Administration, Division of State Planning, Bureau of Comprehensive Planning, 1975, Dames & Moore Analysis of General Soils Atlas For Regional Planning District VII and VIII.

Georgia Department of Natural Resources, 1975, The Value of Vulnerability of Coastal Resources, Atlanta, Georgia, 320 pp.

Greeley and Hansen and Smith and Gillespie, 1979, Central Hillsborough County - Tampa 201 Facility Plan Draft.

Hillsborough County Planning Commission, 1974, Natural Environment and Development: A Planning Background Report.

Kockman, H., 1978, Eastern Indigo Snake/Species Of Special Concern, University Of Florida, Department of Zoology, Gainesville, In: Rare and Endangered Biota Of Florida, 3: 68-69.

Laessle, Albert, 1942, The Plant Communities of the Welaka Area, University Of Florida Publication, Biological Sciences Series No. 1, 4: 1-143.

Lakela, Olga and R.W. Long, 1970, Plants of the Tampa Bay Area, University of South Florida, Tampa, Florida, 109 pp.

Menke, C.G., E.W. Meredith, and W.S. Wetterhall, 1961, Water Resources of Hillsborough County, Florida, Florida Bureau of Geology, R.I. No. 25, 101 pp.

Puri, H.S. and R.O. Vernon, 1964, Summary of the Geology of Florida and a Guidebook to the Classic Exposures, Florida Bureau of Geology, Special Publication No. 5.

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REFERENCES CITED (Cont'd)

Ross, Bernard E., and P. Jenkins, March 1977, Preliminary Report of Findings Concerning the Present and Future Water Quality of Hillsborough Bay as Influenced by the City of Tampa.

Ross, Bernard, E., and P.D. Jenkins, 1978, Computer Simulation of Nutrients in Tampa Bay, Florida, Structures, Materials and Fluids Department, College of Engineering, University of South Florida, August, 1978.

Shattles, P.E., 1965, Quality of Water From The Floridan Aquifer in Hillsborough County, Florid, Florida Bureau of Geology Map Series No. 9.

State Of Florida, Department of Natural Resources, Division of State Parks and Recreation, 1976, Outdoor Recreation in Florida.

Tampa Bay Regional Planning Council, December, 1977, Reservoir Protection Plans For The Tampa Bay Region.

Tampa Bay Regional Planning Council, 1977b, Point Source Inventories For The Tampa Bay Region.

Tampa Bay Regional Planning Council, 1978a, The Areawide Water Quality Management Plan for the Tampa Bay Region.

Texas Instruments Incorporated, September, 1978, Central Florida Phosphate Industry Areawide Impact Assessment Program: Volume V: Water.

U.S. Army Corps of Engineers, 1977b, Four River Basins, Florida Flood Control and Other Purposes Map.

U.S. Department of Agriculture, Soil Conservation Service, 1969, Supplement to the Soil Survey of Hillsborough County, Florida.

U.S. Department of Housing and Urban Development, Federal Insurance Administration, 1977a, Hillsborough County, Florida, Unincorporated Areas Map.

U.S. Department of Housing and Urban Development, Federal Insurance Administration, 1977c, Flood Hazard Boundary Map H-01-4.

U.S Geological Survey, 1977, Water Resources Data for Florida, Water Year 1976, Volume 3: Southwest Florida Water Data Report FL-77-3.

U.S. Geological Survey, Preliminary, Unpublished Data 1979, Configuration of the Bottom of the Floridan Aquifer.

U.S. Geological Survey, 1976b, Preliminary, Unpublished Data, Top of the Major Water Bearing Zones of the Floridan Aquifer.

West Coast Regional Water Supply Authority, 1978, Comprehensive Study of Regional Water Supply Needs and Sources 1980-2020.

Williams, Lovett, E., Jr., 1978, Florida Sandhill Crane, In: Kale, Herbert W. (Ed.) Rare and Endangered Biota of Florida Volume II: Birds, University Presses of Florida, 121 pp.

REFERENCES CITED (Cont'd)

Woolfenden, G., 1968, Live Oak-Cabbage Palm Hammock Winter Bird Population Study, Audubon Field Notes 22: 488.

Wright, A.P., 1974, Environmental Geology and Hydrology of Tampa Area, Florida, Florida Bureau of Geology, Special Publication 19.